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SIMNET CVCC

ANALYSIS OF SIMULATED SINCGARS COMMUNICATIONS IN THE SIMNET CVCC COMPANY-LEVEL EXPERIMENTS:

FT. KNOX CLOSE COMBAT TEST BED,

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Bolt Beranek and Newman, Inc. (BBN)
Systems and Technologies; Advanc. Simulation
10 Moulton Street
Cambridge, MA 02138

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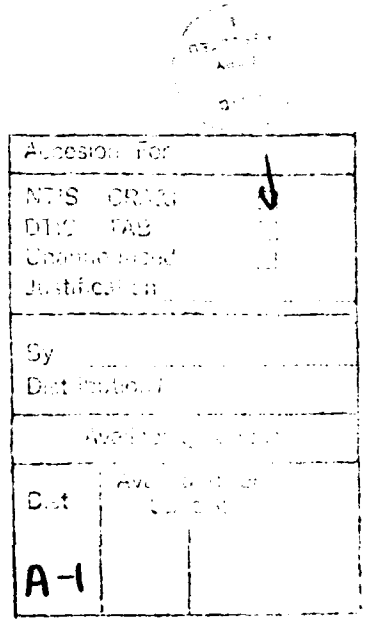

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Prepared by:

BBN Systems and Technologies
Advanced Simulation
10 Moulton Street
Cambridge, MA 02138 USA

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Center for C3 Systems
U.S. Army Communications - Electronics Command (CECOM)
Ft. Monmouth, NJ 07703-5000

Defense Advanced Research Projects Agency (DARPA)
1400 Wilson Blvd.
Arlington, VA 22209-2308

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1. INTRODUCTION

1.1. PURPOSE

This is a report on the Combat Vehicle Command and Control (CVCC) Company-level experiments carried out at the Developmental SIMNET site (now known at the Close Combat Test Bed (CCTB)) at Ft. Knox in the winter and spring of 1990. These experiments were designed and carried by the Army Research Institute's (ARI) Ft. Knox Field Office. The purpose of this document is to describe the results of these experiments as they relate to the use of SINCGARS radios in a combat setting and to CECOM's interests generally.

The CCTB at Ft. Knox consists of a series of M1 simulators which incorporate some of the capabilities expected in the M1A2 Block III tanks now under development. These simulators can be manned by a full complement of tank crews, and used to fight engagements involving man-in-the-loop simulations. The site has Semi-Automated Forces (SAF), both to fill out the friendly units and to simulate enemy forces. The simulators are connected to one another and to the SAF through a network which carries information packets about the positions and states of all the vehicles, whether individual manned simulators or SAF. These packets are collected on the Data Logger and form the basis of the subsequent data analysis.

1.2. OVERVIEW

This document presents our analysis of the data collected during the Company-level experiments and our recommendations for changes both in future experiments and in the simulation.

The next section of this document, Section 2, contains background necessary to understand and interpret the results of the analysis. First, we indicate the elements of the CVCC program which are supported with SIMNET, and describe the level at which they are supported. Next, we describe the experiments that were carried out. Finally, we mention the conditions under which the experiments were conducted, paying particular attention to the limitations of the experiment with respect to analysis of the communications.

The following section, Section 3, describes how the analysis was carried out, given the data that had been collected. Not all the information needed was measured. Some of the missing information could be added to the

data before analysis. This was done by making inferences about the duration or recipients of some of the information being communicated.

The next section, Section 4, describes the results of this analysis. Particular attention is paid to which messages were used most, and the times required to prepare and send such messages. We looked, as well as we were able, at who communicated with whom.

The final section gives the overall conclusions that can be drawn from the analysis described here. We also suggest what might be changed before the Battalion-level experiments are carried out in order to improve the value of the data for CECOM. Finally, we make some recommendations about SINCGARS protocols which we believe, from this analysis, to need changing.

2. BACKGROUND

2.1. DESCRIPTION OF SIMNET CVCC PROGRAM

The U.S. Army's CVCC program is looking at Command and Control issues in the Battalion and below arena, and involves four working groups. These groups are addressing system implementation, soldier-machine interface (SMI) issues, communications, and user needs. SIMNET is supporting Expert Group 2, Communications, chaired by J. Saganowich of CECOM, and Expert Group 3, Soldier-Machine Interface, chaired by Dr. B. Black of ARI. The rest of this section describes the manner in which we are supporting these two groups.

2.1.1. Vehicle Simulators

Bolt Beranek and Newman Inc. (BBN), the SIMNET contractor, has modified standard M1 simulators to support the CVCC program. The modifications include the addition of a position-navigation (POSNAV) system which allows the driver to steer to particular locations using a simple graphic. It also includes a Commander's Independent Thermal (CITV), which provides a thermal view distinct from the Gunner's view. Finally, it includes an implementation of an InterVehicular Information System (IVIS) providing a map display, the ability to send, receive or relay certain of the CVCC messages, and the ability to link messages to the map. A more complete description of the CVCC simulators can be found in BBN Report number 7323, *CVCC User Guide* and BBN Report number 7324, *CVCC System Design Document.*

2.1.2. Radio Simulators

In addition to supplementing the tank simulation, BBN created a simulation of the SINCGARS radio for CECOM. The simulated front panels were installed in the CVCC tank simulators, and software to simulate the transmission characteristics of the radios was installed on a separate computer. The simulation allowed both voice data and IVIS messages to be transmitted over the radio network. A more complete description of the radio simulation can be found in BBN Report number 7352, *SIMNET Simulation of Radio Communication: A Testbed for Investigation of C^3I Technology*.

2.1.3. Support of Experiments

As the experiments were running various kinds of data about the experiments were collected. The major class consisted of packets (or PDUs) sent over the simulation network each time a specified event took place. For example, when a CVCC message was sent, a packet containing information about the type of message, the sender and the time of the event is sent. All these packets are recorded on magnetic tape by the Data Logger. In addition, the Data Logger collects the packets sent by the simulators to indicate their position and status at all times. Thus, a Data Logger tape usually contains sufficient information to re-create a given experiment. These tapes were the source of the data analyzed and discussed here. Additional data analysis was carried out to meet the needs of ARI, and those results have been reported by ARI.

2.2. Description of Experiments

The major events in the offensive and defensive scenarios used in the Company level experiments are described here. A complete description of both experiments is given in Appendix A.

2.2.1. Offensive Scenario

The offensive scenario used in the Company level experiments was a movement to contact exercise. In the first hour of the experiment, the Company moves out, encountering four destroyed vehicles. Then it receives an intelligence update, indicating a minefield and two BMPs, believed to be a platoon-sized covering force. Orders are to destroy this unit. This unit, a Motorized Rifle Platoon, sees the Company and shells it. The Company then engages the Platoon and destroys it. The Company moves on, again observed by the enemy. It is fired upon, engages first a Tank Platoon and then a Motorized Rifle Platoon, calling for fire. On

reaching its first objective, the Company consolidates there, then is subjected to an artillery-delivered nerve gas attack.

At the start of the second hour, the Company receives a Fragmentary Order to move on to a second objective and to destroy the withdrawing enemy unit. The Company moves out, but encounters a Motorized Rifle Platoon. The Company also receives another intelligence update about a minefield and two BMPs. The Company now engages the Motorized Rifle Platoon and destroys it. The Company achieves its second objective and consolidates there. At this point a situational awareness assessment is conducted.

During the final hour of the exercise, the Company receives another Fragmentary Order to move on another objective and maintain pressure on the withdrawing enemy. The Company moves, encountering more destroyed vehicles. Then it encounters a tank platoon, fights and destroys it. They are then informed of a tank battalion heading toward the Company's objective, and are ordered to defeat this counterattack. The Company reaches its objective, consolidates there, and prepares to defend the area. A final situational awareness assessment is held.

2.2.2. Defensive Scenario

The defensive scenario used in the Company level experiments was a delay in sector exercise. In the first hour of the exercise, the Company occupies its area and receives a report that a Brigade sized unit has encountered elements of two enemy Motorized Rifle Regiments. They are under heavy enemy pressure and are withdrawing rapidly with the enemy in full pursuit. Elements of Brigade conduct a Rearward Passage of Lines through the area. Scouts report two or more Motorized Rifle Battalions approaching, The Company then engages 20 to 25 enemy tanks and destrovs them. The Company then requests permission to displace to asubsequent battle positions. They do so, then receive warning of a gas attack.

During the second hour, the Company receives a Fragmentary Order to move to another battle position to prevent the enemy from crossing the river or seizing important road junction. The Company moves. The Company engages an enemy Tank Company at its new position. It comes under fire from enemy helicopters, as well. More enemy attack, but the Company destroys them. They receive an intelligence update indicating some enemy units are stopping to defend their positions while others are moving forward to continue the attack. At this point a situational awareness assessment is held.

At the start of the third hour of the exercise, the Company receives another Fragmentary Order to move to another battle position and defend it. The Company moves to its new position, and receives indirect fire. They receive an intelligence update indicating that friendly scouts need the Company's assistance in a rearward passage of lines. The scouts pass, then the Company engages a Motorized Rifle Battalion until the exercise is halted. A final situational awareness assessment is held.

2.3. CONDITIONS OF EXPERIMENTS

2.3.1. Overall Set Up

The Company-level experiments involved seven CVCC simulators, each with three crew members, a experimenter observing and occupying the loader's position, and two SINCGARS radio front panels. The Company was then filled out with SAF. Figure 1 shows the make up of the Company.

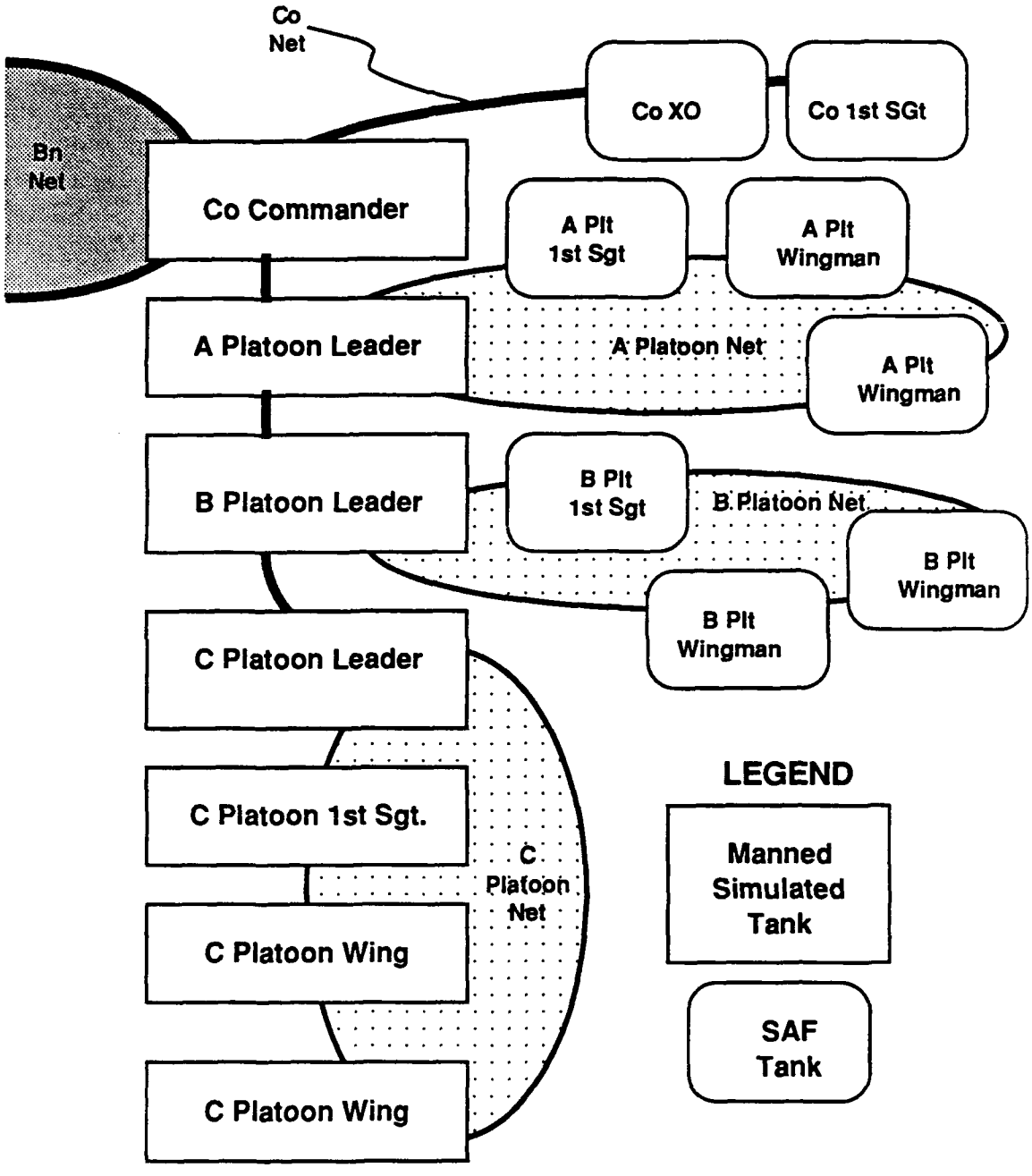

Figure 1. The Company Level Experiment

2.3.2. Messages Used

The implementation of IVIS used in the CVCC simulators consists of only 11 messages. The CVCC standards include more than 30 messages. The messages used in these experiments are shown in Table i. See BBN Report number 7323 for a detailed description of the contents and method of composing each of the messages.

Call for Fire	NBC Report	Spot Report
Contact Report	Adjust Fire	Shell Report
Situation Report	Route	Intelligence Report
Frago (Fragmentary Order)		Ammunition Status Report

Table i
CVCC Messages Available for Use in the
Company-Level Experiments

All the messages listed, with exception of the Frago, can be sent and received by the IVIS in the tank simulator. Fragos, which include map overlays, can only be received.

2.3.3. Use of SINCGARS

In the CVCC program, the SINCGARS radios are to be used for sending both data (i.e. IVIS messages) and voice. Because of initial problems with the radio simulation software, the IVIS messages in this experiment were sent over the simulation Ethernet instead of the radio net. Although these problems were fixed sometime in the winter, experimental conditions could not be changed in the middle of the experiments. Thus, all experiments were run using the SINCGARS simulation only for voice messages.

All CVCC data messages have a primary addressee who must acknowledge the receipt of that message. Unless the sending system receives an acknowledgement within a fixed period of time, the data message is retransmitted. The experiments were run with CVCC messages broadcast over the appropriate net instead. In most cases, this resulted in the message being transmitted to the correct primary and secondary addressees, but, of course, no acknowledgements are used in broadcast mode.

2.3.4. Use of Terrain Modeling

SIMNET employs a data base that describes the terrain on which an exercise is being carried out. This is used to produce the views seen from

the simulators. The SINCGARS simulators use this same database to model the effects of the terrain on message transmission. The simulation employs the Longley-Rice model to describe the propagation of the signal and the SIMNET terrain database to determine whether and where hills and other features will interfere with signal transmission.

Early experiments were run without using the Longley-Rice model, i.e. assuming no interference with signal transmission, because of general radio problems. Although these problems were later corrected, experimental conditions were required to remain the same, so the effects of the terrain on the SINCGARS simulation were not included in the Company-level experiments.

This omission has very little effect on the results of the experiments for two reasons. First, the entire set of exercises was carried out with most tanks within sight of one another on the fairly flat terrain of Ft. Knox. Second, since there were no message acknowledgements, message losses due to terrain would not have resulted in any retransmissions to add to the message traffic.

3. DESCRIPTION OF ANALYSIS

3.1. DATA ON MESSAGES

3.1.1. What Was Measured

The following events triggered a PDU being sent. Unless otherwise indicated, the time of the event and the identity of the initiator of the event were included in the PDU. Additional information contained in the PDU is listed in the right hand column.

Begin creating a message	Message type
Send a message	Message type Originator of message if different from sender.
Arrival of message	Message type. Originator and sender.

For messages that originate from SAF units, the sender is always the highest level individual being simulated in that unit. For example, if a Platoon is being simulated, all CVCC messages appear to come from the Platoon Leader. The CVCC messages coming from the SAF units are

intended to represent messages that have been examined and forwarded, if appropriate, by the unit leaders. Thus, only a portion of the messages could be analyzed for time to compose a given message, for instance. Similarly, in looking at messages being relayed up and down the chain of command, we can include only the SAF originated messages that explicitly get passed on, even though some of them represent messages that have been notionally aggregated and passed on. Additionally, only Contact, Shell and Spot reports are included among messages originating with SAF units. Also, SAF units tend to crank out messages at a higher rate than is the case with manned units.

3.1.2. What Was Inferred

Although CVCC messages were broadcast on a given net, each has an assigned set of primary and secondary recipients. In order to examine needlines, we assumed that a message of a given type was in fact, sent to the primary addressee of that message type.

3.1.3. What Was Computed

We summed the number of each type of message sent by each tank in each exercise segment, and the total of each message type sent both for each segment and for the complete exercise. We computed the time to compose each message, and the average time in each exercise segment to compose each message type. We computed, for each message that was passed on, the distance up and down the chain of command that the message was sent, and the average distance in each exercise segment that a message of a given type was passed on. We also computed the delay, that is the difference between the time the message was initially sent and the time it arrived at the final destination within the Company. Finally, we compared the needlines in the defensive scenario with those derived from the TERI Armored Battalion Characterization Database and reported in their report numer TMO-L801-064A.

3.2. Data on Network Traffic

3.2.1. What Was Measured

The start and stop of each voice communication was recorded, as well as the start of each CVCC message.

3.2.2. What Was Inferred

Since the CVCC messages were not sent via the SINCGARS simulation, it was necessary to make some assumptions in order to evaluate the

communications bandwidth. We assumed that each network packet of a CVCC message would require 158 milliseconds to be transmitted over SINCGARS. Each voice packet would require 23 milliseconds to be transmitted. These figures are based on the size of the packets sent.

3.2.3. What Was Computed

After considerable effort trying to determine a useful measure, we concluded that too little data existed to make it possible to assess bandwidth utilization. The simulation includes bo delays or interference effects, and, as mentioned earlier, there were no acknowledgements or retransmissions. Any attempt to compute a measure of utilization soon foundered on the variety of unknown quantities and the impossibility opf estimating the timing. Finally, the absence of position location messages, expected to be the dominant type, would make any conclusion suspect.

4. DISCUSSION OF RESULTS

The results discussed in this section are tabulated in Appendices B through G. Appendix B contains raw counts of messages utilized. Appendix C contains various measures derived from those counts, such as percent utilization of particular message types, or percent of messages passed up or down the chain of command. Appendix D contains raw counts of message exchanges between senders and receivers on the the Platoon Nets, while Appendix E contains various measures derived from those counts. Appendix F contains raw counts of message exchanges between senders and receivers on the Company Net, while Appendix G contains various measures derived from those counts. A discussion of each of these is given in the subsections below while the Appendices themselves contain a detailed description of each measure.

4.1. UTILIZATION OF MESSAGES

Of the 11 CVCC messages available, the most commonly used are the Contact, Spot and Shell reports. For the offensive scenarios these three reports made up between 64% and 79% (average 72%) of the total reports sent. For the defensive scenarios these three reports made up between 55% and 69% (average 63%) of the total reports sent. This result is undoubtedly influenced by the fact that these are the only three CVCC messages available to the SAF units.

It is interesting to note that overall the defensive scenarios produced about half again as many total messages sent as did the offensive

scenarios. One is tempted to regard this as evidence of a clearer plan of action in the offensive cases.

4.2 Retransmission of Messages

The number of messages that represented passing a given message up or down the chain of command was about 40% of the total messages sent. In the offensive scenarios, the messages that were original messages (i.e. not counting instances of the message after passing it on) ranged from 51% to 63% (average 58%). In the defensive scenarios, the messages that were original messages ranged from 44% to 64% (average 57%).

Average delays in passing messages up and down the chain of command were defined as the time from the initial sending of the message until the reception of that same message by the highest or lowest individual to whom it was passed. Average delays ranged from 37 seconds to 225 seconds, depending on the message type, for messages passed *up* the chain of command. The averages for each message type are shown in Table ii. For messages passed *down* the chain of command, no meaningful number could be computed since the majority of the messages went to SAF units who only received the messages by assertion, with no associated *arrival time.*

	Adj Fire	Am Stat	CFF	Cnt Rep	Shel Rep	Sit Rep	Spt Rep	Intl Rep	Frg	NBC Rep	Rte	TOT
OFFENSIVE	100		87	167	153	75	151	70		37		697
DEFENSIVE	225		79	155	60	107	68			81		792

Table ii
Average Delays for Messages Passed Up the Echelons

4.3 Communication Delays

In each experiment the number of messages originating from manned simulators was approximately half of the total messages of that type. In the offensive scenarios, the messages originating from the manned simulators ranged from 16% to 28% (average 21%). In the defensive scenarios, the messages originating from the manned simulators ranged from 23% to 63% (average 38%).

Some of the CVCC messages are longer and more complex than others. The time message composition was initiated, the time message composition

was completed, and the time the message was sent are all recorded. The time to compose a message ranged from 14 seconds to 89 seconds (average 44 seconds) for the offensive scenarios and from 7 seconds to 100 seconds (average 31 seconds) for the defensive scenarios. The delay between completing message composition and sending the message ranged from 0 seconds to 76 seconds (average 68 seconds) in the offensive scenarios and from 0 seconds to 70 seconds (average 68 seconds) in the defensive scenarios. The average composition time and delay in seconds for each type of message is shown in Table iii. The absence of entries for a particular type of message in the table indicates that no messages of that type were originated from manned simulators.

	Adj Fire	Am Stat	CFF	Cnt Rep	Shll Rep	Slt Rep	Spt Rep	Intl Rep	Frg	NBC Rep	Rte	TOT
OFFENSIVE												
Avg.timeComp.	25	14	21	43	22	70	79	81	53	89		44
Avg.timeSend	101	76	21	58	41	81	112	81	53	90		68
DEFENSIVE												
Avg.timeComp.	20	7	45	39	57	53	54	100	82	65		31
Avg.timeSend	37	12	106	109	126	104	117	100	82	80		68

Table iii
Average Times to Compose and Send Messages

4.4. COMMUNICATION NEEDLINES

Another aspect of the experiment of interest to CECOM is the opportunity to determine communication needlines, that is who sends messages to whom. As discussed above, each type of CVCC message has a fixed set of primary and secondary receivers. This information was used, in connection with the data from the experiments, to determine needlines in the Platoon and Company settings. The raw data that were analyzed for this section are given in Appendix C, and summaries for each exercise are given in Appendix D.

4.4.1 The Platoon Net

On the Platoon Net, the Platoon Leader either sends or receives the vast majority of the messages. In the defensive scenario (see Table iv) he sends or receives 99% to 100% of all the message traffic Of those messages, he sends 12% of them. In the offensive scenario (see Table iv), he also sends or receives 100% of the messages and sends 34% of them himself.

Defensive	Avg Sent	Avg Rec'd	% TOTAL	% Sent	% Rec'd	TERI Sent	TERI Rec'd
Platoon Leader	18	133	99%	12%	88%	45	55
Platoon Sgt.	57	19	50%	74%	26%	21	41
Platoon Wings	78	0	51%	100%	0%	68	18

Table iv
Communication Needlines on the Platoon Net
Defensive Scenario

The Platoon Sergeant exchanges messages only with the Platoon Leader. In the defensive scenario, he is involved in between 34% and 52% (average 50%) of the messages on the Platoon net, and, of those, he sends 74%. Similarly, in the offensive scenario, he is involved with between 38% and 49% (average 46%) of the messages, and., of those, he sends 82%.

Offensive	Avg Sent	Avg Sent	% TOTAL	% Sent	% Rec'd
Platoon Leader	14	156	100%	8%	92%
Platoon Sgt.	63	14	46%	82%	18%
Platoon Wings	92	0	54%	100%	0%

Table v
Communication Needlines on the Platoon Net
Offensive Scenario

The two wingmen send 48% to 66% (average 51%) of the messages in the defensive scenario. All the messages are to the Platoon Leader. The wingmen receive no messages, i.e. they are never designated primary receivers of messages. In the offensive scenario, they send between 51% and 62% (average 54%). Again, all the messages are to the Platoon Leader, and the wingmen receive no messages.

We compared these results with the hypothetical message traffic derived by TERI from its Armored Battalion Characterization Database. The same kinds of data tables were set up and the same measures were computed using the data in the report TMO-L801-064A. Comparisons were made using only the set of messages available to the participants in these experiments; other message traffic was omitted from the analysis., Our analysis shows that the message traffic is less balanced among the participants than shown in the TERI report. In these experiments, the Platoon Leader is the recipient of most of the messages and originates relatively few, while the TERI report predicts that the Platoon Leader would send and receive about the same number. This discrepancy may result, in part, from the fact that the SAF units only have Contact, Spot and Shell Reports to send. These are all reports that, in the Platoon Net, usually originate with the Platoon elements, with the primary receiver being the

Platoon Leader. The Platoon Sergeant is shown receiving more messages than he sends in the TERI analysis, while just the opposite is shown here. Finally, the TERI analysis shows the Wingmen sending many more messages than the receive, which is consistent with these results.

4.4.2 The Company Net

On the Company Net, the communications are similarly concentrated. In the defensive scenario (see Table vi), the Company Commander is involved with 95% to 100% (average 98%) of the messages, and, of those, he receives 95%. In the offensive scenario (see Table vi), the Company Commander in involved with 95% to 100% (average 98%) of all messages, and, of those, he receives 95%.

Defensive	Avg Sent	Avg Rec'd	% TOTAL	% Sent	% Rec'd	TERI Sent	TERI Rec'd
Co Cmdr	4	65	98%	5%	95%	38	59
CoXO	0	0	0%			8	66
A Plt Ldr	31	4	49%	89%	11%	36	7
B Plt Ldr	20	0	28%	100%	0%	35	7
C Plt Ldr	16	0	23%	100%	0%	35	7
Co 1Sgt	0	1	2%	0%	100%	n/a	n/a

Table vi
Communications Needlines on the Company Net
Defensive Scenario

The Platoon Leaders exchanges messages with the Company Commander and the Company 1st Sergeant. In the defensive scenario, the Platoon Leaders are involved with 10% to 68% of all the messages on the Company net, and, of those, they sent 89% to 100%. In the offensive scenario, the Platoon Leaders are involved in 11% to 66% of all the messages, and, of these, they sent 94% to 100%.

Offensive	Avg Sent	Avg Rec'd	% TOTAL	% Sent	% Rec'd
Co Cmdr	2	71	98%	3%	97%
CoXO	0	0	0%		
A Plt Ldr	38	2	54%	94%	6%
B Plt Ldr	18	0	25%	100%	0%
C Plt Ldr	16	0	22%	100%	0%
Co 1Sgt	0	1	2%	13%	88%

Table vii
Communication Needlines on the Company Net
Offensive Scenario

The Company Executive Officer is not involved in any communications on the Company Net, presumably in part because he is not a designated primary receiver of any of the messages actually used. The Company 1st Sergeant is involved with only a few messages, between 0% and 5%, for both scenarios, and he received all of them.

Comparing these results with those in the TERI report, we see that the Company Commander's communications, like the Platoon Leader's on the Platoon Net, are very unbalanced in the experiments compared with the database predictions. The Company Commander receives many times more messages than he sends, although similar amounts of traffic in each direction are predicted. Predictions for the communications involving the Platoon Leaders are essentially on target, while the Company Executive Officer plays a much larger role in the analysis of the TERI data than he did in these experiments. The TERI report did not include any data for the Company 1st Sergeant, who played a small role in the Company Net Communications in these experiments.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1. CONCLUSIONS FROM COMPANY-LEVEL EXPERIMENTS

Because of the way SINCGARS was employed in the Company level experiments at Ft. Knox, any conclusions from the data must necessarily be tentative. Each experiment lasted from three to three and one-half hours. On average, there were a total of 354 IVIS messages sent or relayed during that time or about 2 IVIS messages per minute. The vast majority of the messages were sent from Commanders to their subordinates. It would appear that IVIS messages would put only a small additional burden on the available bandwidth, even if all the message types were available for use. Unfortunately, no other useful conclusions can be drawn because of the extreme limitations on the data available. The results are further confounded by the way the SAF messages are generated.

The human factors results of these experiments are described in ARI's report.

5.2. RECOMMENDATIONS FOR BATTALION-LEVEL EXPERIMENTS

We strongly recommend that CECOM personnel form a working relationship with ARI staff. CECOM personnel must make it clear to ARI what they need from the experiments, and, to the extent possible, what is needed to produce those results. At this point, the scenarios have been

designed and approved, so further influence there is unlikely. It is important to get input to ARI as early as possible, so that it can be factored into the planning and design of the experiments.

Of course, we recommend that the full SINCGARS simulation be employed, including the propagation model and the use of SINCGARS for IVIS messages, including, if possible, the position location messages. It is important to note, however, that this message type is not implemented at present. CECOM must determine whether or not it is useful or important to include individual addressing of messages, instead of having them broadcast on a particular echelon network. Certainly any conclusions about needlines here are hypothetical and based on the mandated sender/receiver pairs, not on experimental evidence. Similarly, it is necessary for CECOM to decide whether or not using frequency hopping in these experiments will result in useful information.

Finally, we would recommend having one or two additional protocols simulated and ready to be inserted into the experiments. The Battalion level experiments are probably the best near term opportunity to investigate the usefulness and robustness of other potential protocols in a realistic setting.

APPENDIX A

Detailed Description of Scenarios for Company-Level Experiments

RESEARCH SCENARIOS USE IN THE COMBAT VEHICLE COMMAND & CONTROL COMPANY EVALUATION IN SIMNET-D

Contributing Authors:
CPT Murphy, DCD
MAJ Cleve, DCD
MAJ Koger, ARI
CPT Davis, C&S
CPT Wild, ARI
Mr. Kerins, BDM

US ARMY RESEARCH INSTITUTE
FORT KNOX FIELD UNIT

JANUARY 1990 THRU MAY 1990

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as of: 6/28/90
dcb

(For Training Purposes Only)

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TF 1-10 AR, 1st BDE, 23AD
ES 795974
270800 SEP 2000

OPORD 2-89
REFERENCES: Map Series V753, V751 Kentucky-Indiana, Sheets M3753 I, II, III, IV; M3760 II, III, Edition 1-AMS, 1:50,000.

Time Zone Used Throughout the Order: Romeo.

Task Organization:

TM B, 1-10 AR B Co, 1-10 AR (-) 1/C/1-92 Mech	A Co, 1-10 AR
TM C, 1-92 Mech C Co, 1-92 Mech (-) 1/B/1-10 AR	D Co, 1-10 AR
TF Control Bn Scout Plt Bn Hvy Mtr Plt 1/A/1-244 ADA(V/S)	TF Trains MST/B/1 FSB

1. SITUATION

A. Enemy:

(1). Overview: The 8th CAA has been attacking for the last 24 hours from SE to NW along the Elizabethtown-Brandenburg axis. The 52nd ID(M) has stopped the first echelon divisions, the 4th MRD and the 17th MRD, just south of Elizabethtown. The commitment of the second echelon divisions of the 8th CAA has forced the withdrawal of the 52nd ID(M). The 39th GMRD and the 1st GTD are currently pursuing the 52nd ID(M). In our sector, we will face elements of the 39th GMRD.

(2). Composition/Disposition: The 39th GMRD consists of the 140th GMRR (BTR), the 144th GMRR (BTR), the 146th GMRR (BMP), and the 79th GTR. Both the 140th and the 144th GMRRs are equipped with BTR-80s. The 146th GMRR is equipped with BMP-2s. The 79th GTR is thought to be equipped with FST-1s. All of the GMRRs tank battalions are equipped with T-80s. The 140th and 144th GMRRs are thought to be the first echelon regiments of the 39th GMRD. They are currently pursuing the 52nd ID(M) vic ES950580 - ES080760 and are estimated to be at 90% strength. The 146th GMRR and 79th GTR are thought to be the 39th GMRD's second echelon and are estimated to be at 95% strength.

(3). Most Probable Course of Action: The 8th CAA will

continue to attack for the next 24-36 hours to secure crossing site(s) over the Ohio River in order to pass the 18th CAA through to continue the attack north. The 39th GMRD will continue to attack along the Elizabethtown-Brandenburg axis for the next 24 hours and attempt to seize crossing sites vic ET820080. The enemy main effort will most likely be in the eastern portion of our sector, along Highway 31W.

B. Friendly:

(1) 1st BDE, 23AD: Delays in sector from 271400 SEP 2000 to 271800 SEP 2000 to slow the enemy advance, force the deployment of the second echelon regiments of the 39th GMRD and 1st GTD prior to PL Trump, and create the preconditions for the Division counterattack by 2nd BDE, 23AD. 1st Bde, 23AD assists with the RPoL and accepts BHO from 52nd ID(M) NLT 271400 SEP 2000.

(2) TF 1-92: Conducts delay in sector to slow the enemy advance and force the deployment of the 2nd echelon regiments of the 1st GTD prior to PL Trump. O/O assists Division counterattack by 2nd Bde.

(3) 210 ACR conducts delay in sector to screen the Corps eastern flank.

(4) 1st BDE, 52nd ID(M) conducts withdrawal and BHO at PL King and executes RPoL through TF 1-10 AR NLT 271400 SEP 2000.

(5) 1-91 Mech prepares defensive positions vic PL Trump. O/O becomes BDE reserve.

(6) 1-50 FA(155SP) DS to 1st BDE, 23AD. 1-51 FA(155SP) GSR to 1-50 FA. PoF are initially to TF 1-10 AR, O/O to TF 1-92 Mech.

(7) A/23rd ENG DS to 1st BDE, 23AD.

(8) A/1-244 ADA(V/S) DS to 1st Bde, 23AD.

(9) 8th TAF supports 1st BDE, 23AD with eight sorties. All sorties are under BDE control.

C. Attachments - see Task Organization.

2. MISSION: TF 1-10 AR conducts delay in sector from 271400 SEP 2000 to 271800 SEP 2000 to slow the enemy advance and force the commitment of the second echelon regiments of the 39th GMRD south of PL Trump. TF 1-10 AR accepts BHO from and assists in the RPoL of 1st BDE, 52nd ID(M) NLT 271400 SEP 2000 at PL King. O/O conduct RPoL through 1-91 Mech.

3. EXECUTION:

A. Concept of the Operation: TF 1-10 AR will conduct a delay in sector in three phases. Phase I - Cover the BHOL with three Co/Tms in BPs 10, 20, and 30. Accept BHO and assist in the RPoL of 1st BDE, 52nd ID(M) at PL King. Heavily attrit the first echelon battalions between PL King and PL Club and determine the enemy's main effort. Phase II - Force the commitment of the second echelon by PL Spade. Phase III - Continue to attrit the enemy second echelon between PL Spade and PL Trump. O/O conduct BHO and RPoL through 1-91 Mech at PL Trump. My intent is to hit the enemy as hard as possible at the BHOL, disrupt his pursuit, and heavily attrit his first echelon battalions. Then we will give

ground to vic PL Club to determine the enemy's main effort. I then want us to keep constant contact with the enemy while avoiding decisive engagement and attrit him as heavily as possible throughout the remainder of the sector. We need to be ready to hold the high ground just south of PL Trump if the Division counterattack is launched early. We will prevent the enemy penetration of PL Trump for at least four hours.

(1) Maneuver:

a. Phase I - A Co, Tm B, and Tm C will occupy BPs 10, 20, and 30 respectively and position at least two platoons forward to overwatch the BHOL. Scouts man Contact Points 1,2, and 3 to coordinate RPoL with 1st BDE, 52nd ID(M) on Passage Lanes White and Gold. Scouts establish observation of enemy forces and follow 1st BDE, 52nd ID(M) through RPoL. A Co, Tm B, and Tm C engage lead enemy forces in EAs Sting, Whip, and Chain. Cos will request permission to displace when enemy Co(+) closes within 1500 meters or enemy element of any size attempts to bypass respective BP. Cos will use internal overwatch to cover displacement within sector. Cos will not cross PL Club without permission. D Co is TF Reserve and occupies BP 40.

b. Phase II - Cos continue to delay in sector. Scouts establish Screen Line 1 along TF eastern boundary. B/P to occupy BPs 11, 21, and 31. D Co is TF Reserve and occupies BP 41. Cos will not cross PL Spade without permission.

c. Phase III - Cos continue to delay in sector. Scouts establish Screen Line Two. B/P to occupy BPs 12, 22, 32, and 41 and defend to retain. O/O establish contact with 1-91 Mech scouts at Contact Points 21, 22, and 23 and conduct BHO and RPoL through 1-91 Mech on Lanes Blue, Green, Orange, Yellow, Purple, and Black. O/O move to AA to become 1st BDE reserve.

(2) Fires (Fire Support Overlay):

a. TF 1-10 AR has priority of FA Fires within the BDE.

b. PoF(FA): Phase I - Scouts, Tm C, Tm B, A Co, D Co; Phase II, III - Tm C, Tm B, A Co, D Co, Scouts.

c. PoF(Mtrs): Phase I - Scouts, A Co, Tm B, Tm C, D Co; Phases II, III - A Co, Scouts, Tm B, Tm C, D Co.

d. Priority Fires: Tm C has one FA Priority Target in Phase I.

e. TF 1-10 AR has two FASCAM minefields available. FASCAM requires BDE Cdr's approval for use.

(3) Obstacles.

a. PoE: Tm C, Tm B, A Co, D Co.

b. PoM: Phase I, II - C/M, S, M

(4) ADA:

a. WCS - Tight.

b. ADW - Yellow.

c. Priority of Protection - Phase I thru III: Reserve, TOC, Tm C, Tm B, A Co.

B. Subordinate Unit Instructions:

(1) Tm B - Phase I: Occupy BP 20. Provide guides for Passage Lane Gold. Phase II: B/P to occupy BP 21. Phase III: B/P to occupy BP 22. B/P to conduct RPoL on Passage Lanes Orange and Yellow.

(2) Tm C - Phase I: Occupy BP 30. Provide guides for Passage Lane White. Phase II: B/P to occupy BP 31. Phase III: B/P to occupy BP 32. B/P to conduct RPoL on Passage Lanes Purple and Black.

(3) A Co - Phase I: Occupy BP 10. Phase II: B/P to occupy BP 11. Phase III: B/P to occupy BP 12. B/P to conduct RPoL on Passage Lanes Blue and Green.

(4) D Co - Phase I-III: B/P to reinforce Tm C/Tm B sector once enemy's main effort is identified. B/P to conduct counterattack by fire to maintain integrity of the TF sector.

(5) Scouts - Phase I: Establish Contact Points 1, 2, and 3 NLT 271200 SEP 2000. Priority of FA/Mtr Fires until RPoL. Consolidate at CP 10 following RPoL. Phase II: Establish Screen Line 1. Phase III: Establish Screen Line 2.

(6) Mortars - Phase I: Occupy Initial FP vic CP 17. B/P to operate split section to support TF delay. Phase II-III: Move under control of TF FSO. B/P to coordinate own RPoL.

(7) ADA - Phases I-III: Provide one Stinger team to maneuver with Tm C, Tm B, TOC, D Co, Trains. Vulcan Plt maneuvers with Tm B.

D. Coordinating Instructions:

(1) PIR

a. Report sightings of FST-1s.

b. Report any use of chemical munitions.

c. Report any airmobile operations.

(2) Priority of Friendly Information

a. Report BHO from 1st BDE, 52nd ID(M) at PL King and initial enemy contact.

b. Report commitment of second echelon regiments of 39th GMRD.

c. Report any penetrations of Plt size or greater at all PLs.

d. Report crossing all PLs.

(3) No IF south of PL King until after BHO is complete.

(4) Forward Co/Tms establish alternate Passage Lanes to support RPoL of 1st BDE, 52nd ID(M).

(5) Recognition symbol for RPoL is orange panel marker on the front of the vehicle during the day, red flashlight at night.

(6) OEG is 70 cGy. Report at 5cGy.

(7) MOPP level 1 is in effect NLT 271300 SEP 2000.

(8) Disengagement criteria: MRC elements within 1500 meters, or an enemy element of any size attempting to bypass a BP.

4. SERVICE SUPPORT. Annex C.

5. COMMAND AND SIGNAL

A. Command

(1) CMD Group A will be with Tm B.

(2) CMD Group B will be with A Co.

(3) Bn TOC initial location ES873926, subsequent location ES851947.

(4) Alternate CP is Combat Trains CP.

(5) Succession of Command: Bn XO, S-3, D Co Cdr., Tm

B Cdr, A Co Cdr, Tm C Cdr.

B. Signal

(1) Current CEOI is in effect.

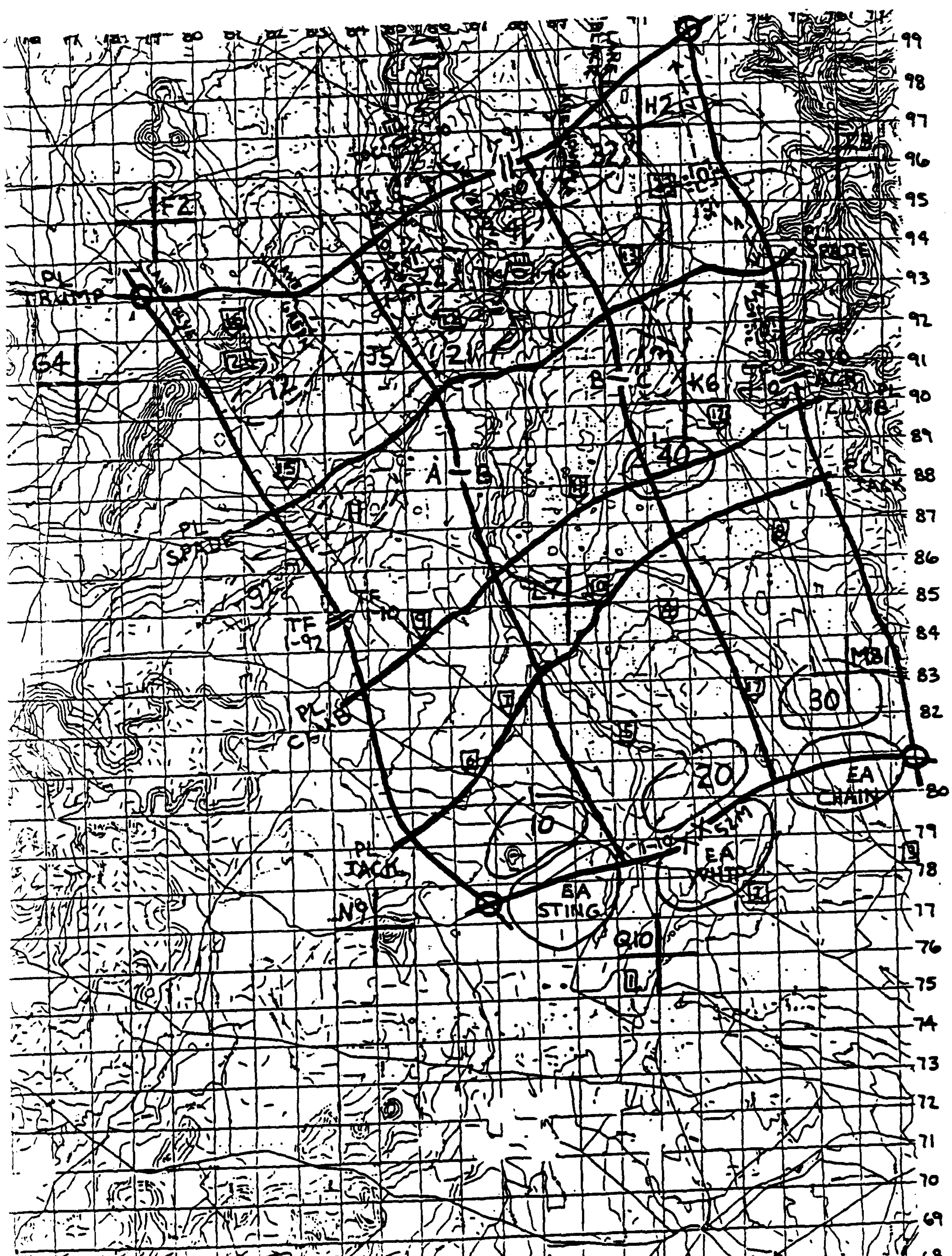
Acknowledge.

Hardcore
LTC, ARMOR

OFFICIAL:
SMITH
ASST S3

Inclosures:
Operations Overlay
Fire Support Overlay

(For Training Purposes Only)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PL SPADE
PL CLUB
PL JACK
PL SPADE
PL JACK
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G4
J5
H2
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N9
Q10
M81
A—B
B—C
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A/1-10 AR OPORD

1. SITUATION

A. Enemy:

(1) Overview: The 8th CAA has been attacking for the last 24 hours from SE to NW along the Elizabethtown-Brandenburg Axis. The 39th GMRD and the 1st GTD are currently pursuing the 52nd ID(M). In our sector, we will face the 39th GMRD.

(2) Composition/Disposition: The 39th GMRD consists of the 140th GMRR(BTR), the 144th GMRR(BTR), the 146th GMRR(BMP), and the 79th GTR. Both the 140th and the 144th GMRRs are equipped with BTR-80s. The 146th GMRR is equipped with BMP-2s. The 79th GTR is thought to be equipped with FST-1s. All of the GMRRs tank battalions are equipped with T-80s. The 140th and 144th GMRRs are thought to be the first echelon regiments of the 39th GMRD. They are currently pursuing the 52nd ID(M) vic 03 EW gridline and are estimated to be at 90% strength. The 146th GMRR and 79th GTR are thought to be the 39th GMRD's second echelon, and are estimated to be at 95% strength.

(3) Most Probable Course of Action: The 8th CAA will continue to attack for the next 24-36 hours. The enemy main effort will most likely be in the eastern portion of our sector, along Highway 31W. They will attack two up, one back, until they achieve success, where they will attack on line. We can expect to see the enemy using limited recon assets. Friendly scouts and ACRs have been successful in the counterrecon battle and have stripped away the enemy recon so that we can expect to see the OPFOR in prebattle formations.

B. Friendly:

(1) TF 1-10 AR conducts a delay in sector from 271400 SEP 2000 to 271800 SEP 2000 to slow the enemy advance and force the commitment of the second echelon regiments of the 39th GMRD south of PL Trump. TF 1-10 AR accepts BHO from and assists in the RPoL of 1st BDE, 52nd ID(M) NLT 271400 SEP 2000 at PL King. O/O conduct RPoL through 1-91 Mech.

(2) TF 1-92 is on our right conducting a delay in sector.

(3) Tm B is on our left occupying BP 20.

(4) D Co is to our rear with the primary mission of reinforcing Teams B and C.

C. Attachments: None.

2. MISSION: A/1-10 AR conducts a delay in sector from 271400 SEP 2000 to 271800 SEP 2000 at BP 10 to slow the enemy advance and force the commitment of the second echelon regiments of the 39th GMRD south of PL Trump. A/1-10 AR accepts BHO from and assists in the RPoL of 1st BDE, 52nd ID(M) NLT 271400 SEP 2000 at PL King. O/O conduct RPoL through 1-91 Mech.

3. EXECUTION:

A. Concept of the Operation: A/1-10 AR will conduct a delay in sector in three phases. Phase I - Cover the BHOL at BP 10. Accept BHO and assist in the RPoL of 1st BDE, 52nd ID(M) at PL King. Phase II - Force the commitment of the second echelon by PL Spade. Phase III - Continue to attrit the enemy second echelon between PL Spade and PL Trump. O/O conduct BHO and RPoL through 1-91 Mech at PL Trump. My intent is to hit the enemy as hard as possible at the BHOL, disrupt his pursuit, and heavily attrit his first echelon battalions. Then we will give ground to vic PL Club to determine the enemy's main effort. I want us to keep constant contact with the enemy while avoiding decisive engagement and attrit him as heavily as possible throughout the remainder of the sector. We need to be ready to hold the high ground just south of PL Trump if the Division counterattack is launched early. We will prevent the enemy penetration of PL Trump for at least four hours.

(1) Maneuver:

a. Phase I - A Co will occupy BP 10 (vic ES879796) to overwatch the BHOL. 1st Platoon will be on the left (BP 131, vic ES889800), 2nd Platoon in the middle (BP 121, vic ES879796), and 3rd Platoon on the right (BP 111, vic ES873786). A Co engages lead enemy forces in EA Sting. We will request permission to displace when enemy Co.(+) closes to within 1500m or enemy element of any size attempts to bypass our BP. We will use internal overwatch to cover our displacement within sector to BP 11 (vic ES835878) and BP 12(vic ES820910). 2nd Platoon will initially overwatch 1st and 3rd Platoons' displacement to BPs 132 (vic ES876820) and BP 112 (vic ES842825) respectively. 1st and 3rd Platoons will then overwatch 2nd Platoon's displacement to BP 122 (vic ES862849). We will not cross PL Club without permission.

b. Phase II - A Co continues to delay in sector. B/P to occupy BP 11. 2nd and 3rd Platoons will overwatch the displacement of 1st Platoon to BP 133 (vic ES846887). 1st and 2nd Platoons will then overwatch the displacement of 3rd Platoon to BP 113 (vic ES835868). 1st and 3rd Platoon will then overwatch the displacement of 2nd Platoon to either BP 11 (vic ES835878) or BP 123 (vic ES823913), depending on the situation. A Co will not cross PL Spade without permission.

c. Phase III - A Co continues to delay in sector. B/P to occupy BP 12 (as specified in Phase I above) and defend to retain. 1st and 3rd Platoons will overwatch the displacement of 2nd Platoon to BP 123 (vic ES823913). 1st and 2nd Platoons will then overwatch the displacement of 3rd Platoon to BP 114 (vic ES812901). 2nd and 3rd Platoons will then overwatch the displacement of 1st Platoon to BP 134 (vic ES835922). O/O 2nd and 3rd will send one tank each to establish contact with 1-91 Mech scouts at Contact Point 21. 3rd Platoon will conduct BHO and RPoL through 1-91 Mech on Lane Blue. 1st and 2nd Platoons will move on Lane Green. O/O move to AA (to be specified).

(2) Fires:

a. PoF(FA): Phase I - A Co is fourth in priority. Phases II and III - A Co is third in priority.

b. PoF(Mtrs): Phase I - A Co is second in priority. Phases II and III - A Co has priority of fires.

c. PoF within company is 2, 1, 3.

(3) Obstacles:

a. PoE: A Co is third in priority.

b. PoM: Phase I, II - C/M, S, M. Phase III - C/M, S, M; O/O S, C/M, M, at PL Trump.

(4) ADA

a. WCS - Tight.

b. ADW - Yellow.

c. Priority of Protection - Phase I-III: A Co is fifth in priority.

B. Subordinate Unit Instructions:

(1) 1st Platoon:

a. Occupy BP 131 (vic ES889800).

b. O/O displace to BP 132 (vic ES876820) using maneuver technique described above.

c. O/O, displace to BP 133 (vic ES846887).

d. O/O, displace to BP 134 (vic ES835922).

(2) 2nd Platoon:

a. Occupy BP 121 (vic ES879796).

b. O/O displace to BP 122 (vic ES862849) using maneuver technique described above.

c. O/O, displace to BP 123 (vic ES823913).

d. O/O at BP 123, send one tank to link up with Scouts from TF 1-91 at Contact Point 21 (vic ES809915).

(3) 3rd Platoon:

a. Occupy BP 111 (vic ES873786).

b. O/O displace to BP 112 (vic ES842825) using maneuver technique described above.

c. O/O, displace to BP 113 (vic ES834868).

d. O/O, displace to BP 114 (vic ES812901).

e. O/O at BP 114, send one tank to link up with Scouts from TF 1-91 at Contact Point 21 (vic ES809915).

D. Coordinating Instructions:

(1) PIR

a. Report sightings of FST-1s.

b. Report any use of chemical munitions.

c. Report any airmobile operations.

(2) Priority of Friendly Information.

a. Report BHO from 1st BDE, 52nd ID(M) at PL King and initial enemy contact.

b. Report commitment of second echelon regiments of 39th GMRD.

c. Report any penetrations of plt size or greater at all PLs.

d. Report crossing all PLs.

(3) No Indirect Fire south of PL King until after BHO is complete.

(4) Recognition symbol for RPoL is orange panel marker on the front of the vehicle during the day, red flashlight at night.

(5) OEG is 70 cGy. Report at 5 cGy.

(6) MOPP Level One is in effect NLT 271300 SEP 2000.

(7) Disengagement criteria: MRC(+) elements within 1500 meters, or enemy element of any size attempts to bypass a BP.

4. SERVICE SUPPORT (per SOP).

5. COMMAND AND SIGNAL.

A. Command

(1) Co Cdr will be with 2nd Plt.

(2) Bn Cdr. is with Tm B.

(3) Succession of Command: XO, 2nd PL, 1st PL, 3rd PL.

B. Signal

(1) Current CEOI is in effect.

as of 6/28/90
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CVCC EXPERIMENT
CO/TM DEFENSE TEST

FRAGO #1 TO OPORD 2-89

1. ENEMY MRB PLUS HAS PUSHED TM B BACK TO VIC CP 11. BYPASSED TM B TANK REPORTS ENEMY TANK COMPANY PLUS MOVING SE TO NW TOWARDS YOUR SECTOR VIC ES913824.

2. A/1-10 AR MOVES TO, DEFENDS BP 14, PREVENTS ENEMY FROM CROSSING RIVER.

3A. AREA OF OPS:
(1) BP 14 IS ES860850 - ES860870 - ES868853 - ES866873.
(2) ALL OTHER GRAPHICS REMAIN.

3B. A COMPANY MOVES TO, DEFENDS BP 14, TO PREVENT ENEMY CROSSING OF RIVER OR SEIZURE OF THE ROAD JUNCTION VIC ES870861. MOVE ASAP. ENSURE YOU MAINTAIN CONTACT WITH ENEMY IN YOUR SECTOR. REPORT WHEN SET.

4. N/A.

5. N/A.

ACKNOWLEDGE.

6/28/90
jwk

CVCC EXPERIMENT
(EXPERIMENTAL MODE)
CO/TM DEFENSE TEST

FRAGO #1 TO OPORD 2-89

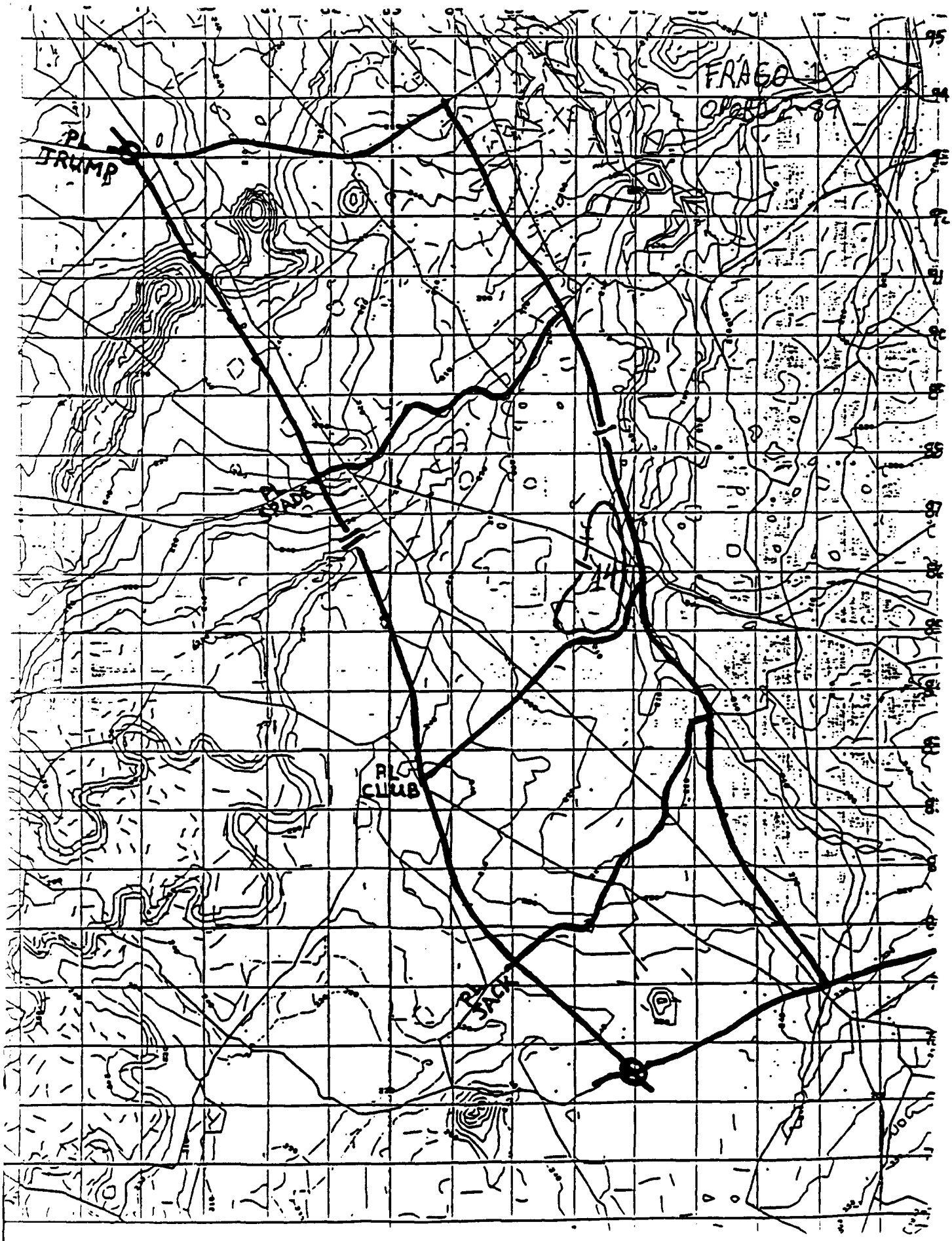
1. **CVCC FRAGO TEXT**

DEFEND BP14 DENY
EN RIVER CROSS MOVE
ASAP RPT SET

2. **VERBAL (FM RADIO) ELABORATION**

ENEMY MRB PLUS HAS PUSHED TM B BACK TO VIC CP 11. ENEMY TANK COMPANY PLUS MOVING SE TO NW TOWARDS YOUR SECTOR VIC ES913824. ENSURE YOU MAINTAIN CONTACT WITH ENEMY IN YOUR SECTOR.

ACKNOWLEDGE.


FRAGO
PL TRUMP
PL CLUB
PL JACK

as of 6/28/90

CVCC EXPERIMENT
CO/TM DELAY TEST

FRAGO #2 TO OPORD 2-89

1. ENEMY MAIN EFFORT SHIFTING WEST ALONG HWY. 91 (ES870861-794928).

2. TF 1-10 DEFENDS TO RETAIN BATTLE POSITION SOUTH OF PL TRUMP, PREVENT ENEMY PENETRATION, AND HOLD THE EASTERN SHOULDER FOR THE DIVISION COUNTERATTACK, TO BE LAUNCHED IN 30 MINUTES.

3. A COMPANY OCCUPIES BP 13 CENTER OF MASS (ES794907), ORIENTS TO SOUTHEAST. TM B OCCUPIES BP 23 (ES835925), ORIENTS SOUTH. TM C OCCUPIES BP 22 (ES853934) ORIENTS S-SE. D COMPANY OCCUPIES BP 42 (ES818921), ORIENTS S-SE. TF REAR BOUNDARY IS PL TRUMP. FORWARD BOUNDARY IS PL SPADE. WESTERN BOUNDARY IS ES761916 TO ES814874. EASTERN BOUNDARY IS ES855951 TO ES876909. SCOUTS SCREEN ALONG PL SPADE. A COMPANY HAS PRIORITY OF FIRES AND IS ALLOCATED ONE (1) FPF (C/N BINGO) FROM ES805903 TO ES810906. BEGIN MOVEMENT NOW.

4. N/C

5. N/C

ACKNOWLEDGE.

6/28/90
jwk

CVCC EXPERIMENT
(EXPERIMENTAL MODE)
CO/TM DEFENSE TEST

FRAGO #2 TO OPORD 2-89

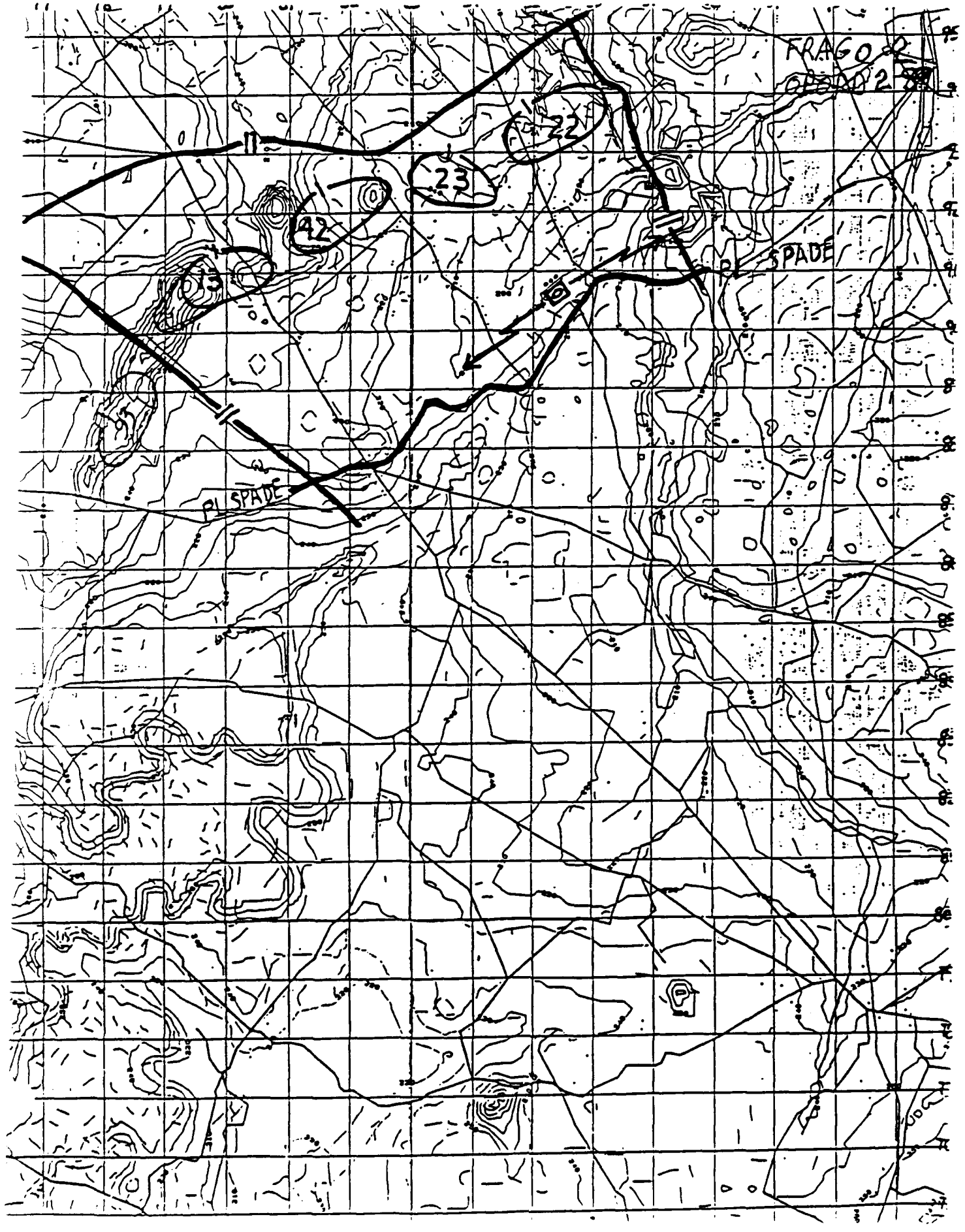
1. **CVCC FRAGO TEXT**

DEFEND BP13 NO EN
BEYOND PLTRUMP
MOVE ASAP RPT SET

2. **VERBAL (FM RADIO) ELABORATION**

ENEMY MAIN EFFORT SHIFTING WEST ALONG HWY. 91 (ES870861-ES794928). TF 1-10 DEFEND TO RETAIN POSITIONS SOUTH OF PL TRUMP. HOLD THE EASTERN SHOULDER FOR THE DIVISION COUNTERATTACK TO BE LAUNCHED IN 30 MINUTES. A COMPANY HAS PRIORITY OF FIRES AND IS ALLOCATED ONE (1) FPF (C/N BINGO) FROM ES805903 TO ES810906. SCOUTS SCREEN ALONG PL SPADE.

ACKNOWLEDGE.


FRAGO 22
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PL SPADE
PL SPADE

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dcb

CVCC EXPERIMENT
CO/TM DEFENSE/DELAY TEST

SCENARIO EVENTS LIST

Reference: OPORD 2-89

Phase 0: Preparation for operation.

General: Unit leaders are issued OPORD, unit personnel prepare simulators for operation. Unit sub-leaders issue OPORDS. Unit is initialized near its initial battle position.

(T-2:00) Event 0.1 Co. Cdr. arrives and receives Bn. & Co. OPORD.

Event 0.2: Controller/Bn. S3 issues Bn. OPORD to Co. Cdr.

a. Complete five-paragraph order.
b. Cdr. is furnished with:
(1) Operations Overlay.
(2) Fire Support Overlay.
(3) Written Company OPORD.
(a) Company graphics.
(b) Company SOP as required.

(T-1:30) Event 0.3: Co. Cdr. backbriefs the S3/Controller on the plan. It is important that this is monitored to ensure a standard operation for each test.

(T-1:15) Event 0.4: Co. Cdr. issues order to Plt Ldrs.

a. During this time the unit will conduct its Troop Leading Procedures. Battalion will not allow the physical conduct of rehearsals, but the Co. Cdr. can make use of map or terrain model rehearsals. All graphics will be disseminated throughout the company.
b. Platoon Leaders will backbrief the Co. Cdr. The S3/Controller must monitor these briefbacks to ensure that every leader has the proper concept.

(T-1:00) c. Troops arrive and prepare simulators.

(T-0:45) d. Plt. Ldrs. issue OPORD to troops.

(T-0:30) Event 0.5: Unit is Initialized at Initial Battle Position.

Event 0.6: Unit conducts pre-combat checks and prepares to defend BP 10.

Phase I: Defense of BP 10.

Segment A: Occupation and Preparation of BP 10.

Event 1: (T-0:15) Unit Occupies and Prepares BP 10.

a. Intel Update (B-C-P-T) - Scouts report contact with elements of 1st BDE, 52nd ID(M). They are under heavy EN pressure and withdrawing rapidly with the EN in full pursuit. They are currently along a line from ES870775 - ES974817 and will be conducting a rearward passage of lines through our sector within the next 30 minutes. They have identified elements of the 144th and 146th MRRs pushing NW from Elizabethtown grid ES900720 towards our sector. Expect contact during or immediately following the passage of lines.

b. Unit prepares range cards (T-P-C-B).

c. Reports: SITREP

(1) Location - ES875800 (center/mass)

(2) Activity - defending

(3) LOG status

Event 2: Unit assists BLUEFOR RPoL

a. Intel Update (B-C-P-T) - Elements of 1st BDE, 52nd ID(M), conducting Rearward Passage of Lines through Tm B and Tm C on Lanes White and Gold. Scouts report 2-3 MRBs moving in Co. columns vic ES905744, ES952760, and ES974756. ID T-64s and BMP-2s.

b. FRAGO (B-C-P-T) - Scout section 1 will move through your BP on new lane, designated LANE SILVER (ES905783-ES871804) in five minutes.

c. Scout section 1 moves through BP 10.

d. Intel Update (B-C-P-T) - Scouts identified two or more MRB-sized units moving into our sector from the SE.

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Event 3: Non-flagged Radio Traffic Generated by BM

"Y03, this is B06, I have encountered heavy enemy pressure. I am now in contact with four MRCs plus. Continuing to engage. Out."

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Segment B: Unit Defends BP, Destroys OPFOR, Reports.

Event 1: Reports:
a. CONTACT - Enemy tanks, BMPs; location (ES895770).
b. SPOTREP - Type (tanks, BMPs), Location (see above), Number (20-25), Activity (attacking).

Event 2: Unit engages 20-25 Enemy tanks/BMPs (2 MRCs plus). Bn. calls for SITREP.

Event 3: At disengagement line, Co. Cdr. requests permission to displace to subsequent BPs. Bn gives permission to displace.

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Event 3.5: Non-flagged Radio Traffic Generated by BM

"Y03, this is B06, I have lost three vehicles. Request permission to displace. Over."
"B06, this is Y03, Roger, displace now. Out."

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Segment C: Unit Conducts Disengagement and Displacement.

Event 1: Co. Cdr. orders platoons to displace to subsequent battle positions.

Event 2: Platoons displace as ordered.
a. 2nd Platoon moves to BP 132, reports SET when in position.
b. 1st and 3rd Platoons move simultaneously to BPs 112 & 122 respectively. Both report SET when ready.
c. 2nd Platoon receives Indirect Fire, reports with a SHELLREP.

Event 3: Co. Cdr. reports SET to Bn. when Company is set in position.

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Event 3.2: Non-flagged Radio Traffic Generated by BM

"C06, this is Y03, Displace now. Report REDCON ONE prior to moving send SITREP. Out."

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Event 3.5: IFF/Unit Continues to Engage Enemy Stragglers, Does Not Engage BLUEFOR.

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Event 3.6: NBC Radio Traffic

" A-31 this is A34 , GAS,GAS,GAS. I have just observed 6 artillery rounds impact. Break, M-8 paper has reacted Enemy personnel are masked, and those that are not are dropping to the ground in convulsions."

Unit. (P-C-B) Unit submits NBC-1 Report

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Phase II: FRAGO #1 To BP 14

Segment A: Unit Receives FRAGO and Moves.

Event 1: Unit Receives FRAGO.

a. FRAGO #1 (B-C-P-T) - "En MRB (+) has pushed Tm B back to vic CP 11. Bypassed Tm B tank reports En Tank Co.(+) moving SE to NW towards your sector vic ES913824. Move to BP 14 (ES860850-860870-868853-866873) ASAP. Orient E/SE, prevent En from crossing the river or seizing the road junction vic ES870861. Ensure you maintain contact with the En in your sector. Report when set."

b. Co. Cdr. acknowledges receipt of FRAGO, issues movement orders/locations for Plts.

Event 2: Unit Moves to BP 14.

a. The bulk of the company moves through the vic of CP9.

b. When in BP 14, Co. Cdr. reports set to report location (Set in BP 14), activity (Defending), LOG Status.

Event 3: IFF - As Unit Moves and Sets at BP 14, It Does Not Engage Friendly Stragglers.

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Event 3.5: Non-flagged Radio Traffic Generated by BM

"A06, this is Y03, B06 receiving pressure. You have control in your Area of Operations. Keep me informed. Out."

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Segment B: Unit Defends BP 14 Against OPFOR Tk. Co. From SE.

Event 1: Reports

a. CONTACT - tanks, SE, (vic ES890852)

b. SPOTREP - Type (tanks/BMPs), Location (see above), Number (10-14), Activity (Attacking)

Event 2: Unit Engages OPFOR With Direct and Indirect Fire.

a. Co. Cdr. gives Call For Fire.
b. Co. Cdr. issues Co. Fire Cmd.
c. Plt. Ldrs. issue Plt Fire Cmds.
d. Unit receives Indirect Fire, sends SHELLREP.

Event 3: Unit Comes Under OPFOR Air Attack

a. CONTACT Report: choppers, SE (vic ES890852).
b. SPOTREP - Type (Hind-D/M24s), Location (see above), Number (2), Activity - (Attacking).

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Event 3.5: Non-flagged Radio Traffic

"Y03, this is B06, I am now observing three MRCs plus at 3000 meters. Preparing to engage. Over."
"B06, this is Y03, Roger. Out."

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Segment C: Unit Receives Pressure From the South.

Event 1: Reports

a. CONTACT, BMPs, South (vic ES867827).
b. SPOTREP, Type (BMPs), Location (see above), Number (6), Activity (Attacking).

Event 2: Unit Engages OPFOR.

a. Co. Cdr. (or PL for S sector) gives CFF.
b. Unit destroys OPFOR by fire.

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Event 2.1: Non-flagged Radio Traffic

"Y03, this is B06, I have lost two vehicles. We have stopped two MRCs. Request permission to displace. Over."

Event 2.2: Non-flagged Radio Traffic

"B06, this is C06, I have your remaining MRC in sight. Am engaging. Out."

Event 2.3: Non-flagged Radio Traffic

"Y03, this is B06. My situation is now stable. Enemy appears to have halted, Over."
"B06, this is Y03, Roger, Out."

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Event 3: Unit Prepares to Continue Defense.

a. Intel Update (B-C-P-T) - It appears that the Enemy first echelon units have halted and are going into a hasty defense. Bde reports Enemy second echelon forces moving forward to continue the attack.
All elements submit SITREPS and continue to Delay in Sector back to PL SPADE. Bde engineers have finished emplacing GEMs minefield from ES807892 to ES813901.

b. Co. Cdr. sends SITREP to Bn.

(1) Location - BP 14
(2) Activity - Continuing mission
(3) LOG Status

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Event 3.5: Non-flagged Radio Traffic

"Y03, this is L06 (Bde. Cdr.), your push, break---We have second echelon in sector. Meet L03 on my push. Out."

Event 3.9: Break/Situational Awareness Assessment

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Phase III: Unit Receives FRAGO #2 to Defend BP 13.

Segment A: Unit Receives FRAGO #2 and Moves to BP 13.

Event 1: FRAGO #2 - Bde. reports En main effort shifting W along Highway 91 (ES870861 - ES794928). The Bn. is shifting its entire sector W to prevent En penetration of PL TRUMP and to hold the high ground just south of PL TRUMP. TF Rear Boundary is PL TRUMP. Forward Boundary is PL SPADE. Western Boundary is ES761916 to ES814874. Eastern Boundary is ES855951 to ES876909. Scouts screen along PL Spade. We must hold the Eastern shoulder of the Division Counterattack, which will be launched in thirty minutes. Move to BP 13 (COM ES794907) ASAP. Orient SE along Highway 91. Defend to retain BP 13. Do not allow En to penetrate along Highway 91. A Company, ycu now have Priority of Fires and are allocated one FPF (C/N-BINGO) from ES805903 to ES810906. Report when set.

Event 2: Co. Cdr. acknowledges, issues movement orders and plt positions, orders move out.

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Event 2.1: Non-flagged Radio Traffic

"Y03, this is C06, Moving now, over."

"C06, this is Y03, Roger, Out."

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Event 2.2: Non-flagged Radio Traffic

"Y03, this is B06, moving now, over."

"B06, this is Y03, Roger, out."

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Event 3: Unit Moves To and Occupies BP 13.

a. Unit moves through CP15, and avoids GEMs minefield.

b. Unit moves past friendly elements vic BP 42, conducts IFF, does not engage friendlies.

c. Co. Cdr.reports SET when company has occupied BP 13: Location (SET in BP 13), Activity (Defending, Oriented SE), LOG Status.

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Event 3.2: Non-flagged Radio Traffic

"Y03, this is D06, moving now, over."

"D06, this is Y03, roger, out."

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Event 3.3: Non-flagged Radio Traffic

"Y03, this is C06, Set. Over."

"C06, this is Y03, roger, out."

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Event 3.4: Non-flagged Radio Traffic

"Y03, this is B06, Set, over."

"B06, this is Y03, roger, out."

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Event 3.5: Non-flagged Radio Traffic

"Y03, this is D06, set, over."

"D06, this is Y03, roger, out."

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Segment B: Unit Defends BP 13

Event 1: Unit receives Indirect Fire, sends SHELLREP.

//

Event 2: Unit Assists RPoL of BLUEFOR Scouts.

a. Cdr. receives Intel Update/Frago from Bn.

(1) "A06, this is Y03, scouts report two MRBs(+) moving SE to NW toward your position, vic. ES834873. B and C Cos. report heavy concen-

trations of indirect fire their locations."

(2) "A06, this is Y03, scouts withdrawing along Highway 91, now designated Passage Lane FROG. Assist their rearward passage of lines.

(a) Cdr. issues appropriate order to Company.

(b) Co. does not engage friendly scouts during their rearward passage of lines.

Event 3: Unit Defends BP 13 against an MRB (+)

a. Reports

(1) CONTACT - tanks/BMPs, SE (vic ES818884)

(2) SPOTREP - Type (BMPs with tank spt), Location (see above) Number (30-40), Activity (Attacking).

b. Unit engages MRB(+) with Direct and Indirect Fire.

(1) Co. Cdr. submits CFF.

(2) Co. Cdr. fires FPF BINGO.

(3) Co. Cdr. submits SITREP.

c. Unit continues to hold and to report until the Battlemaster halts the exercise.

Segment C: ENDEX/SITUATIONAL AWARENESS ASSESSMENT

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AS OF 2/19/90
DCB

CVCC EXPERIMENT
OPFOR OVERVIEW
CO/TM DEFENSE/DELAY TEST

The OPFOR in this scenario represent elements of the Eighth Combined Arms Army; specifically, the 39th Guards Motorized Rifle Division. The 39th GMRD consists of three Motorized Rifle Regiments (MRRs), two of which (the 140th and the 144th) are equipped with BTR-80s, and one of which (the 146th) is equipped with BMP-2s. The MRRs' tank battalions are equipped with T-80s. The division's Tank Regiment (the 79th Guards Tank Regiment) is equipped with FST-1s.

As the scenario begins, the 39th GMRD is in contact and pushing back the U.S. 52nd Infantry Division (Mechanized) toward the Army objective, which is Brandenburg, Kentucky.

Phase I: CVCC-DEFENSE-(ALL)-2

In this operation, the OPFOR have four Motorized Rifle Companies (BMP-2) and four Tank Platoons (T-80). Each Tank Platoon is mated with an MRC, and maneuvers along the same routes to the same objective. Tactically, these four MRCs represent two OPFOR battalions, now somewhat understrength due to the fact that they have been fighting and pushing back the U.S. 52nd ID(M).

The OPFOR attack with their four MRCs on line, and their attached tank platoons in front. Their objective is OBJ TOLSTOY, a linear objective running approximately from ES8478 to ES8981. When the MRCs cross PL Trigger, OPFOR artillery will begin to bombard significant terrain and likely enemy positions along and immediately in front of the objective.

When the OPFOR cross RED CFL ("Check Fire Line"), OPFOR artillery will shift to targets behind the objective (the OPFOR operator ceases to drop OPFOR artillery at this point).

The OPFOR have an additional control measure: RED LOA ("Limit of Advance"). This control measure may be used to halt the OPFOR short of the objective, and thus prevent intermingling of BLUFOR and OPFOR vehicles. This control measure is not programmed into the OPFOR units' missions; if the Battlemaster orders a halt at RED LOA, the OPFOR operator must give a SUSPEND UNIT MOVEMENT command to each OPFOR unit.

Phase II: CVCC-DEFENSE-(ALL)-2

During this phase of the operation, OPFOR units are still advancing on all fronts. The test company's neighboring unit has been forced back, and the company has been moved to a subsequent battle position to defend a river crossing. The OPFOR in this phase come in three separate "packets". The first OPFOR contact will be made by a Tank Company with an attached Motorized Rifle Platoon. This force will approach the test company from the East/Southeast, and attempt to force their way across the river. The Tank Company provides a base of fire while the Motorized Rifle Platoon attempts to cross the bridge and close with the test company.

The second OPFOR contact will occur after the first contact has been made, but before the first OPFOR unit has been destroyed. This second OPFOR contact will consist of two Motorized Rifle Platoons which attack the company position from the south. These units should be activated in such a way as to ensure that they come within engagement range of the company while the company is hotly engaged with the first OPFOR unit.

The third OPFOR "packet" is a Rotary Wing Aircraft (RWA) unit (helicopters). This unit will attack along the river valley to the company's front. These helicopters should make their attack after the first two OPFOR units have been dealt with. The OPFOR operator should not activate this unit until the last few vehicles of the first two OPFOR units are being dispatched by the company. Only then should the OPFOR operator start the RWA unit on its mission. The reason for this is that the RWA unit moves very rapidly, and these helicopters are programmed to fly fast and low (i.e., realistically). The company will have its hands full engaging the RWA unit.

As in Phase I, the OPFOR have three control measures: PL Trigger, RED CFL, and RED LOA. In all cases, as soon as any OPFOR unit crosses PL Trigger, OPFOR artillery will begin to impact on and around the company. When any OPFOR unit reaches RED CFL, OPFOR artillery fire ceases. Upon approaching RED LOA, the OPFOR operator should advise the Battlemaster of this fact, and be prepared to command all OPFOR units to SUSPEND UNIT MOVEMENT.

Phase III: CVCC-DEFENSE-(ALL)-3

In Phase III, the OPFOR reaches the final stage of its offensive. The Blue Forces have pulled back into their final "Die In Place" battle positions.

The OPFOR attacks in Phase III with a full Motorized Rifle Battalion plus attached Tank Company. The MRB advances with two MRCs up and one back. Each MRC has an attached Tank Platoon which moves immediately in front of it.

The OPFOR attack is along Route Borscht to OBJ BORSCHT. The usual OPFOR control measures function in the usual manner.

The OPFOR artillery fire should be unusually heavy in this phase, to simulate the fact that this is the dying gasp of the OPFOR offensive. The OPFOR would either break through decisively or go over to the defensive after this battle.

The OPFOR operator should be prepared, on order of the Battlemaster, to alter OPFOR fire parameters.

6/28/90

(For Training Purposes Only)

Copy ____ of ____ Copies
TF 1-10 ARMOR, 1st BDE, 23 AD
ET862017
271200 SEP 2000

OPORD 9-20

REFERENCES: Map Series V753, V751 Kentucky - Indiana, Sheets M3753 I, II, III, IV; M3760 II, III, Edition 1-AMS, 1:50,000.

Time Zone Used Throughout the Order: Romeo.

Task Organization:

A/1-10 AR	TEAM B	TEAM C	D/1-10 AR
	B/1-10 AR (-)	C/1-91 IN (-)	
	3/C/1-91 IN	3/B/1-10 AR	
	1/A/23 EN		

TF CONTROL	TF TRAINS
SCOUT PLT/1-10 AR	MST/B/1 FSB
HVY MORT PLT/1-10 AR	
1/A/1-244 ADA (V/S)	

1. SITUATION

A. Enemy.

(1) Overview: The 8th CAA, after a successful attack, has established a hasty defense (VIC 92 E-W Gridline) in order to establish lines of communications and supply with its rear area. Enemy contact has been lost throughout the BDE sector. The 39 GMRD is believed to be in the 1/ BDE sector, with the 146th MRR (BMP) in the TF 1-10 sector.

(2) Composition and Disposition: The 39th GMRD consists of the 140th MRR (BTR), the 144th MRR (BTR), the 146th MRR (BMP), and the 79th TR. The overall strength of the division is 40-50%. The 140th and 144th MRRs are equipped with BTR-80s and the 146th MRR with BMP-2s. Tank battalions of the MRRs have T-80 tanks. The 79th Tank Regiment is thought to have FST-1 tanks.

(3) Most Probable Course of Action: The 39th GMRD is economizing forces in a defensive belt in the vicinity of Elizabethtown (ES9971). The 146th MRR (BMP) is currently conducting a withdrawal to consolidate its defensive efforts vicinity Elizabethtown to the southeast. The 146th MRR will have a covering force deployed in the TF 1-10 sector consisting of platoon size and smaller elements. A rear guard consisting of a company (+) size element will probably be delaying in the vicinity of OBJ COPPER (ES8472).

B. Friendly.

(1) 1st BDE, 23AD conducts a movement to contact 280500 SEP 2000 to seize OBJs COPPER and BRASS (ES9473) and to regain contact with the enemy.

(2) TF 1-91 conducts movement to contact on the eastern flank to seize OBJ BRASS.

(3) 2nd BDE conducts movement to contact on the western flank to envelop the enemy as part of the division pursuit.

(4) TF 3-4 AR, 3rd BDE, 52ID defends from battle positions along the LD/PL NASH.

(5) 1-12 ARMOR follows TF 1-10.

(6) 1-50 FA (155MM SP) is in Direct Support to 1st BDE, 1-51 FA (155MM SP) reinforces 1-50 FA.

(7) No air support is available.

C. Attachments and Detachments. See Task Organization.

2. MISSION. 1-10 ARMOR conducts movement to contact at 280500 SEP 2000, to gain contact with enemy forces and seize OBJs BRONZE, TIN, AND ZINC (vic ES800805), O/O seize OBJ COPPER (ES850720) as BDE main effort.

3. EXECUTION. Annex A (Operations Overlay).

A. Concept of the Operation. TF 1-10 conducts a forward passage of lines through TF 3-4 AR, 3rd BDE, 52 ID. We will then conduct a movement to contact using a battalion diamond formation to gain contact with the enemy and seize OBJ BRONZE, TIN, AND ZINC, O/O continue the attack to seize OBJ COPPER. My intent is to move rapidly, bypass smaller than platoon-sized elements and find the enemy. As he is withdrawing, I want to keep the pressure on and overrun him. Our objective is more to make and maintain contact than to seize terrain.

(1) Maneuver. TF 1-10 will move from the Assembly Area to the Line of Departure using routes Red and Black. A Company will lead on Route Red, followed by CMD Group A, Team C, TF Trains. Team B will lead on Route Black followed by Heavy Mortars, CMD Group B, and D Company. The Scouts will cross the LD at 280400 SEP 2000 using both Route Red and Black to screen 3-5 KM forward of A Company.

TF 1-10 will move in a battalion diamond with A Company leading as Advance Guard. A Company will be without attachments to aid in fast movement. A Company must bypass units smaller than platoon size, report and bypass all obstacles. Team B will be on the western flank, Team C in the east and D Company trailing. When A Company clears CP 12 the formation must be formed.

Team B

<---Scouts A Company Mortars D Company

Team C

At OBJ BRONZE, A Company will consolidate, orienting southeast. Team B will consolidate on OBJ TIN, orienting south/southeast, and Team C will consolidate on OBJ ZINC, orienting east/southeast. D Company will move to vic CP 15 as Battalion Reserve. Scouts screen along PL CARL.

O/O TF 1-10 continues movement to OBJ COPPER. Same formation will be used. A Company seizes CP 10, Team B CP 4, and

Team C CP 7. D Company consolidates at CP 13 as Reserve, Scouts screen along PL JOE.

(2) Fires. Annex B (Fire Support Overlay).

a. TF 1-10 AR has priority of FA fires within the BDE.

b. Priority of FA fires - Scouts, A Company, Team B.

c. Priority of Mortars - Team B, Team C, D Co.

d. TF 1-10 has two FASCAMs available, Bde Cdr. approval required for use.

(3) Engineering

a. POE - M, CM, S

b. POM - Team B

(4) ADA

a. Weapon Control Status - Tight

b. Air Defense Warning - Yellow

c. Priority of Protection - D Co., Team B, TOC.

B. Subordinate Unit Instructions.

(1) A Co. - at OBJ BRONZE, B/P to seize CP 15. At OBJ COPPER B/P to seize CP 4 and suppress CP 10.

(2) Team B - B/P to conduct obstacle breaches alone and as the TF breaching force. B/P to assume mission of advanced guard.

(3) Team C - B/P to assume mission of advanced guard.

(4) D Co. - At OBJ BRONZE, B/P to seize CP 18. At OBJ COPPER, B/P to seize CP 10.

(5) Scouts - B/P to assume flank guard mission to west.

(6) Mortars - Move behind Team B. At OBJ BRONZE, consolidate vic CP 14. At OBJ COPPER, consolidate behind D Co., at CP 13.

(7) ADA - Move with Team B throughout the operation. Ensure that Stinger Teams are positioned to support D Co., Team B, TOC, and TF Trains.

C. Coordinating Instructions.

(1) PIR

a. Obstacle locations

b. Report use of FST-1

(2) MOPP Level 1 is in effect 280300 SEP 2000. MOPP 2 for personnel in the BSA.

(3) OEG is 70 cGy.

4. SERVICE SUPPORT. Annex C.

5. COMMAND AND SIGNAL.

A. Command

(1) CMD Group A with A Company.

(2) CMD Group B with Team B.

(3) Bn. TOC initial location is ES794984, subsequent locations ES778877, ES795815, ES845726.

(4) Alternate CP is Combat Trains CP.

(5) Succession of Command: Bn. XO, S-3, D Co. Cdr., B Co. Cdr., A Co. Cdr., and C Co. Cdr.
(6) Bde TOC located ET845008, then vic ES808915

B. Signal.
(1) Current CEOI is in effect.

Acknowledge.

BULL
LTC, ARMOR

OFFICIAL:

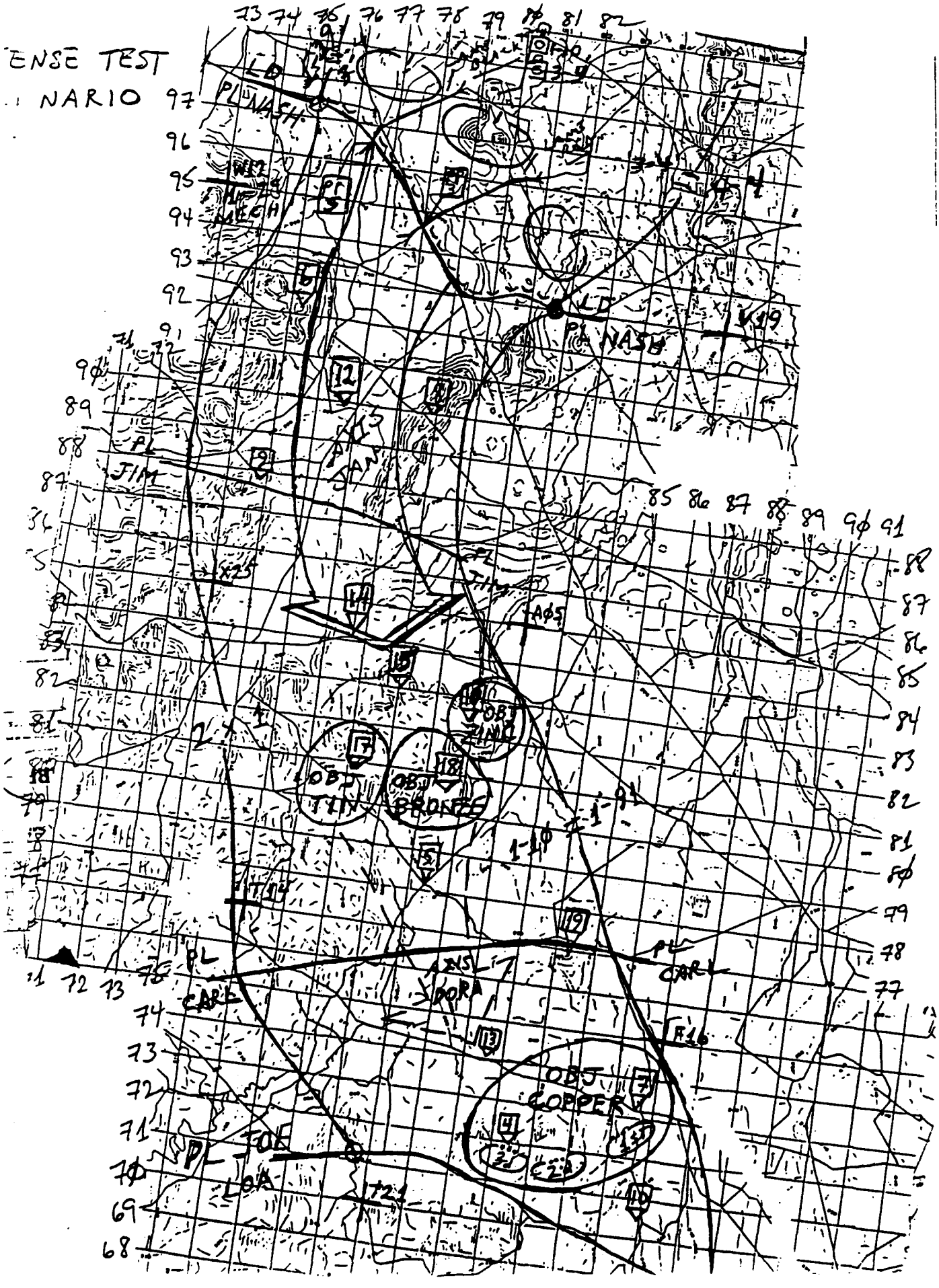
BEHRINGER, S-3

ANNEXES: Operations Overlay
Fire Support

(For Training Purposes Only)

ENSE TEST

NARIO



6/28/90

MOVEMENT TO CONTACT
A Co. OPORD

1. Situation.

A. Enemy

(1) Overview: The 8th CAA, following a successful attack, has established a hasty defense (vic 91 E-W gridline) in order to establish lines of communication and supply with its rear area. Enemy contact has been lost throughout the sector. The 39th GMRD is believed to be in the 1st Bde. sector, with the 146th MRR (BMP) believed to be in the TF 1-10 sector.

(2) Composition and Disposition: The 39th GMRD consists of the 140th MRR (BTR), the 144th MRR (BTR), the 146th MRR (BMP) and the 79th TR. The overall strength of the division is 40-50%. The 140th and 144th MRRs are equipped with BTR-80s and the 146th MRR with BMP-2s. Tank battalions of the MRRs have T-80 tanks. The 79th TR is thought to have FST-1 tanks.

(3) Most Probable Course of Action: The 39th GMRD is economizing forces in a defensive belt in the vicinity of Elizabethtown (ES990710). The 146th MRR (BMP) is currently conducting a withdrawal to consolidate its defensive efforts vic Elizabethtown to the southeast. The 146th MRR will have covering forces deployed in the TF 1-10 sector of platoon sized and smaller elements. A rear guard consisting of a company (+) size element will probably be delaying in the vicinity of OBJ COPPER (850720).

B. Friendly.

(1) Team B - At OBJ TIN, consolidates, O/O seizes CP 4.

(2) Team C - At OBJ ZINC, consolidates, O/O seizes CP 7.

(3) D Co. - Consolidates vic CP 15 as TF Reserve. At OBJ COPPER, consolidates vic CP 13 as TF Reserve.

(4) Mortars - Move behind Team B. At OBJ BRONZE, consolidate vic CP 14. At OBJ COPPER, consolidate behind D Co. at CP 13.

2. MISSION. A Company, 1-10 Armor, conducts a movement to contact at 280500 SEP 2000 to gain contact with enemy forces and seize OBJ BRONZE (ES800805), o/o, continue the attack southeast to OBJ COPPER (ES850720).

3. EXECUTION.

A. Concept of the operation. A Company, TF 1-10, conducts a movement to contact along AXIS JAN using a company wedge formation to gain contact with the enemy and seize OBJ BRONZE, o/o continue the attack south to seize OBJ COPPER. My intent is to move rapidly, bypass smaller than platoon-sized elements and find the enemy. Our objective is more to make and maintain contact than

to seize terrain.

(1) Maneuver. A Company will move from the AA to the LD in a company column, platoons in column, along Route Red. Second Platoon will lead, followed by First and Third Platoons respectively. Second Platoon will cross the LD at 280500 SEP 2000. We will move in a company wedge, along AXIS JAN, bypassing units smaller than platoon size. First Platoon will be on the left, with Second in the middle, and Third on the right.

At OBJ BRONZE, First Platoon will consolidate vic ES808812, orienting southeast; Second Platoon vic ES805802, orienting south/southeast; Third Platoon vic ES854710, orienting south.

O/O, A Company continues movement to OBJ COPPER. Same formation to be used. First Platoon will consolidate vic ES875710; Second Platoon vic ES872703; Third Platoon vic ES865702.

(2) Fires. Fire Support Overlay.

a. We are second in priority within TF, behind Scouts.

b. Priority of fires within the company is Second, First, and Third, respectively.

(3) Engineers.

a. POE - M, C/M, S

b. POM - Team B.

(4) ADA

a. Weapon Control Status - Tight.

b. Air Defense Warning - Yellow.

c. Priority of Protection - D Co., Team B, TOC.

B. Subordinate Unit Instructions.

(1) First Platoon - at OBJ BRONZE, consolidate vic ES808812, at COPPER, vic ES875710.

(2) Second Platoon - at OBJ BRONZE, consolidate vic ES805802, at COPPER, vic ES872703.

(3) Third Platoon - at OBJ BRONZE, consolidate vic ES793803, at COPPER, vic ES865702.

C. Coordinating Instructions.

(1) PIR

a. Obstacle locations.

b. Report use of FST-1 tanks.

(2) MOPP Level 1 in effect 280300 SEP 2000, MOPP 2 for personnel in the BSA.

(3) OEG is 70 cGY.

4. SERVICE SUPPORT.

5. COMMAND AND SIGNAL.

A. Command.

(1) CO will be with Second Platoon.

(2) XO will be with Co. Trains.

(3) 1SG will be with Co. Trains.

(4) Succession of Command: XO, Second Platoon, First Platoon, Third Platoon.

B. Signal.

(1) Current CEOI is in effect.

6/28/90
DCB

CVCC EXPERIMENT
CO/TM MTC TEST

FRAGO #1 TO OPORD 9-20

1. TF 1-91 HAS BEEN HELD ON OUR EASTERN FLANK NEAR PL JIM. AN ENEMY TANK COMPANY(+) IS WITHDRAWING TO THE SOUTHEAST.

2. MOVE TO CONTACT TO OBJ SILVER TO DESTROY WITHDRAWING ENEMY UNIT.

3A. AREA OF OPS:
(1) BOUNDARIES, NORTHWEST - RJ ES830831
NORTHEAST - RJ ES946804
SOUTHWEST - RJ ES802781
SOUTHEAST - RJ ES929742
(2) WEST BOUNDARY IS PL PAULA
(3) EAST BOUNDARY IS PL MIKE
(4) CP 20 - RJ ES847790
(5) CP 21 - HILLTOP ES874788
(6) PL PAM IS ROAD FROM ES878821 TO ES843769
(7) CP 24 - RJ ES897788
(8) CENTER MASS OBJ SILVER - ES895790

3B. A COMPANY LEADS BATTALION DIAMOND AS ADVANCED GUARD. TM B FOLLOWS ON SOUTHERN FLANK, TM C IN THE NORTH AND D COMPANY TRAILING. A COMPANY CROSSES LD AT _____ (T+1:15) AND MOVES THROUGH CHECKPOINTS 20 AND 21 TO SEIZE CP 24.

ACKNOWLEDGE

6/28/90
jwk

CVCC EXPERIMENT
(EXPERIMENTAL MODE)
CO/TM MTC TEST

FRAGO #1 TO OPORD 9-20

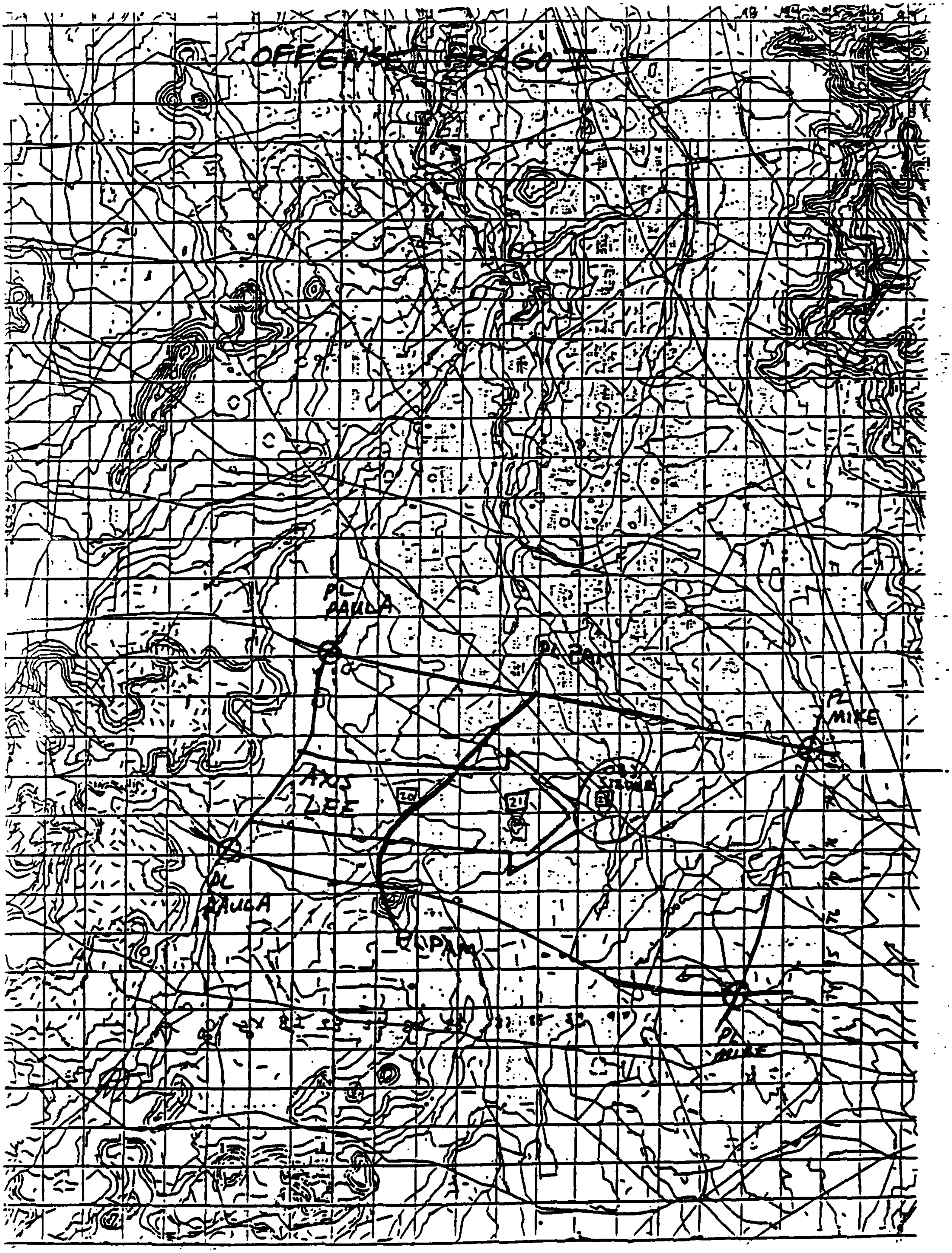
1. **CVCC FRAGO TEXT**

MOVE TO CONTACT TO
DESTROY EN FORCES
VIC OBJ SILVER

2. **VERBAL (FM RADIO) ELABORATION**

TF 1-91 HAS BEEN HELD ALONG PL JIM. A COMPANY LEADS BATTALION DIAMOND AS ADVANCED GUARD. LD TIME IS _____. MOVE THROUGH CHECKPIONTS 20 AND 21 TO SEIZE CHECKPOINT 24.

ACKNOWLEDGE.


PL
PAULA
AXIS
LEE
20
21
PL
PAULA
PL
MIKE
PL
MIKE

6/28/90
DCB

CVCC EXPERIMENT
CO/TM MTC TEST

FRAGO #2 TO OPORD 9-20

1. TF 1-91 HAS ELIMINATED RESISTANCE AT PL JIM AND IS READY TO CONTINUE MOVEMENT.

2. 1-10 ARMOR CONDUCTS MOVEMENT TO CONTACT TO OBJ GOLD TO MAINTAIN PRESSURE ON WITHDRAWING ENEMY.

3A. AREA OF OPS:
(1) BOUNDARIES: NORTHWEST - HILLTOP ES875788
NORTHEAST - RJ ES914782
SOUTHEAST - RJ ES912690
SOUTHWEST - RJ ES842702
(2) NORTH BOUNDARY IS LD/PL TAMMY from ES875788 to ES914782
(3) SOUTH BOUNDARY IS LOA/PL LISA from ES842702 to ES912690
(4) CP 31 - ROAD BEND ES889751
(5) CP 32 - HILLTOP ES866732
(6) PL FORD from ES852735 to ES911726
(7) CP 33 - HILLTOP ES883699
(8) CENTER MASS OBJ GOLD - ES883700

3B. A COMPANY LEADS BATTALION DIAMOND AS ADVANCED GUARD. TM B FOLLOWS ON EASTERN FLANK, TM C IN THE WEST, AND D COMPANY TRAILING. A COMPANY CROSSES LD AT _____ (T+2:15) MOVING WEST OF CP 31 AND THROUGH CP 32 TO SEIZE OBJ GOLD.

4. N/A.

5. N/A.

ACKNOWLEDGE.

6/28/90
jwk

CVCC EXPERIMENT
(EXPERIMENTAL MODE)
CO/TM MTC TEST

FRAGO #2 TO OPORD 9-20

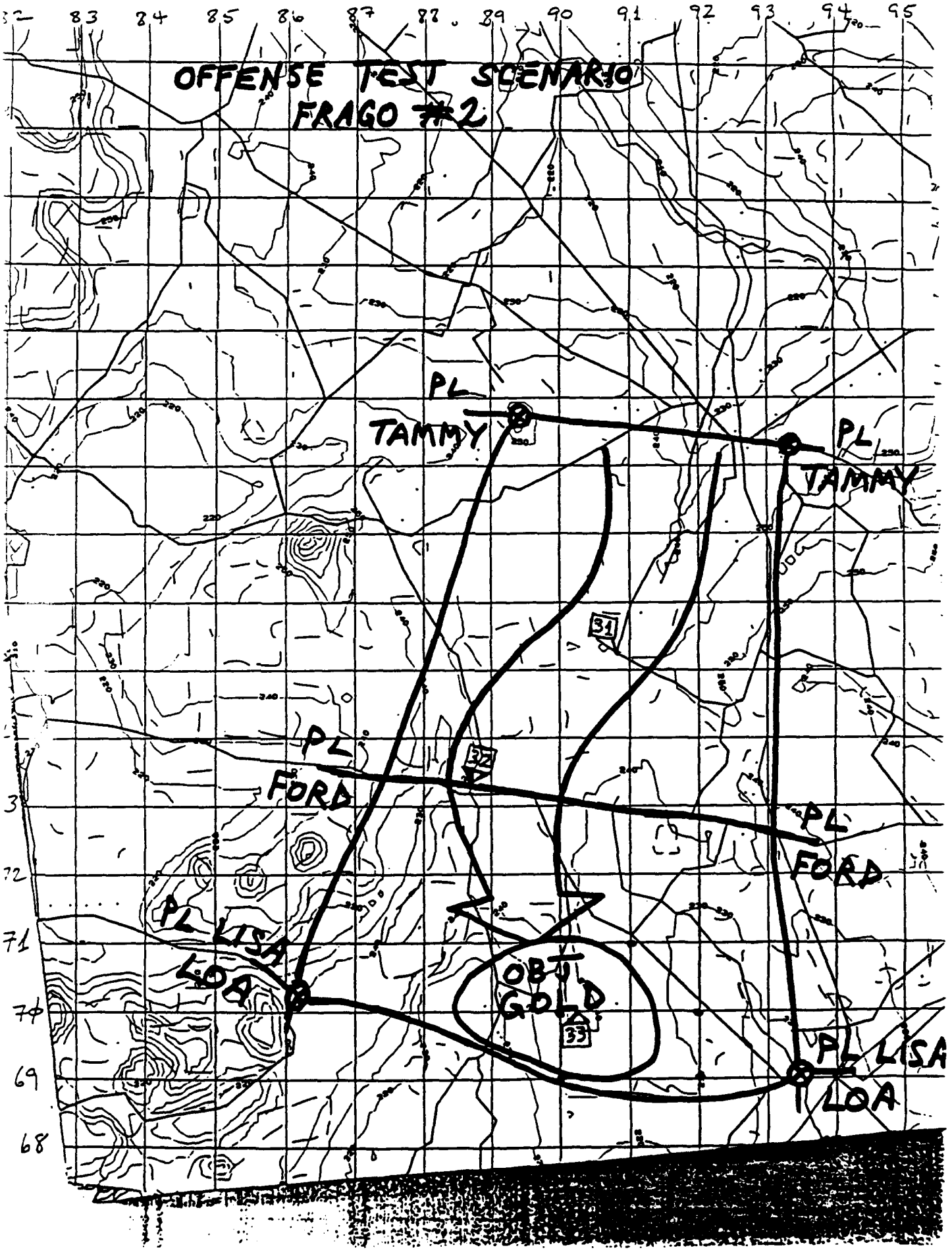
1. **CVCC FRAGO TEXT**

MOVE TO CONTACT TO
KEEP PRESSURE ON
WITHDRAWING EN

2. **VERBAL (FM RADIO) ELABORATION**

TF 1-91 HAS ELIMINATED RESISTANCE ALONG PL JIM. TF 1-10 CONDUCTS MOVEMENT TO CONTACT TO OBJECTIVE GOLD TO MAINTAIN PRESSURE ON WITHDRAWING ENEMY. A COMPANY LEADS BATTALION DIAMOND AS ADVANCED GUARD. LD TIME IS _____. MOVE WEST OF CHECKPOINT 31 AND THROUGH CHECKPOINT 32 TO SEIZE CHECKPOINT 33.

ACKNOWLEDGE.


OFFENSE TEST SCENARIO
FRAGO #2
PL TAMMY
PL TAMMY
31
PL FORD
32
PL FORD
PL LISA LOA
OBJ GOLD
33
PL LISA LOA

DCB
as of: 6/28/90

CVCC EXPERIMENT
CO/TM MTC TEST

SCENARIO EVENTS LIST

Reference: OPORD 2-90

Phase 0: Planning and Preparation

(T-2:00) Event 0.1: Co. Cdr. arrives and receives Bn. & Co OPORD.

Event 0.2 Controller/Bn. S3 issues Bn. OPORD to Co. Cdr.

a. Complete five-paragraph order
b. Cdr. is furnished with:
(1) Operations Overlay
(2) Fire Support Overlay
(3) Written Company OPORD
(a) Company graphics
(b) Company SOP as required

(T-1:30) Event 0.3: Co. Cdr. backbriefs the S3/Controller on the plan. It is important that this is monitored to ensure a standard operation for each test.

Event 0.4: Co. Cdr. issues order to Plt Ldrs.

a. During this time the Unit will conduct its Troop Leading Procedures. Battalion will not allow the physical conduct of rehearsals, but the Co. Cdr. can make use of map or terrain model rehearsals. All graphics will be disseminated throughout the company.
b. Platoon Leaders will backbrief the Co. Cdr. The S3/Controller must monitor these briefbacks to ensure that every leader has the proper concept.

Event 0.5: Unit is Initialized at Assembly Area.

(T-0:30) Event 0.6: Unit Conducts Pre-combat Checks and Prepares to Move.

a. Pre-Combat checks include:
(1) Posting all graphics on a map and inputting graphics into onboard displays.
(2) Inputting waypoints for the driver.

(3) Checking all systems.
(4) Reports REDCON ONE (C-B) before moving.

****** CONDUCT GRAPHICS ACCURACY CHECK AND RECORD PREP-
****** PARATION TECHNIQUES (i.e., Inputted Waypoints, Set
****** Sectors on CITV)

(T-0:15) Event 0.7: Unit is initialized in column formation near passage lane and marches to LD on Lane Red.

PHASE I: Unit Begins Movement To Contact, Seizes OBJ BRONZE.

Segment A: Unit Moves To Contact, Encounters MR Platoon

(T+0:00) Event 1: Unit crosses LD at the LD Time.
a. Plt. Ldrs. report LD crossing to Co. Cdr.
b. Co. Cdr. reports LD crossing to Bn.

___ Event 2: Unit encounters four destroyed vehicles.
___ a. ID - Unit correctly IDs the vehicles as dead and does not waste ammunition on them.
b. Co. Cdr. sends SPOTREP on the sighting.

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

Event 2.1: Non-flagged Radio Traffic
"Y02, this is S11, CONTACT, vic. ES740890, BMPs, moving to cover, out."
"Y02, this is S11, SPOTREP, Enemy BMPs, infantry, location vic. ES7489, attacking, I am pinned down, over."
"S11, this is Y03, Indirect Fire on the way, HE/VT and Smoke. Attempt to break contact and bypass."

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

(T+:05) Event 3: Company receives Intel Update and Orders
a. Intel Update (B-C-P-T) - "A06, this is Y03, scouts have identified minefield at ES748895 to ES751892 and two BMPs at ES749879, Y02 believes them to be a platoon-sized covering force. Attack to destroy this unit.
b. Co. Cdr. passes on this information, and issues a Company FRAGO to attack MR platoon.

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

Segment B: Unit Encounters and Destroys Enemy MR Platoon

(T+:10) Event 1: Enemy MR Plt observes unit
a. Unit receives Indirect Fire.
b. Unit sends SHELLREP.

Event 2: Unit Fights Enemy
a. Unit receives Direct Fire from MR Plt vic. CP 12.
b. Unit sends CONTACT Report - three BMPs.
c. Unit engages MR Plt with direct and indirect fire.
(1) Unit sends SPOTREP
(2) Co. Cdr. sends CFF.
(3) Unit avoids minefield
(4) Unit observes BLUEFOR Scout vehicles vic. the minefield; does not engage them (IFF).
(5) Unit destroys MR Platoon. Sends SPOTREP, continues mission.

(T+:25) Event 3: Unit Crosses PL JIM.
a. Co. Cdr. reports crossing time.
b. Unit is observed by Enemy.
(1) Unit receives Indirect Fire.
(2) Unit sends SHELLREP.
c. Unit fights to seize OBJ BRONZE.
(1) Enemy engages with direct and indirect fire.
(2) Unit conducts hasty attack using fire and maneuver.
(3) Unit sends CONTACT Report.
(4) Co. Cdr. sends CFF.
(5) Unit sends SPOTREP.
(a) WHAT - Tank Platoon/3 tanks.
(b) WHERE - ES775842
(c) ACTIVITY - Hasty Defense
(d) Unit location/activity (continuing mission).
(6) Unit sends SPOTREP.
(a) WHAT - MR Plt/3 BMPs.
(b) WHERE - ES762828
(c) Hasty Defense.
(d) Unit location/continuing mission.

(7) Unit sends SPOTREP.
(a) Enemy Trains/2 fuel, 2 ammo trucks, 1 rec vehicle, 1 tank.
(b) OBJ BRONZE.
(c) Conducting resupply.
(d) Continuing mission.

Segment C: Consolidation and Reorganization.

(T+:45) Event 1: Unit Consolidates and Reorganizes on OBJ BRONZE, vic. CP 15.

Event 2: Unit sends SITREP.
a. Unit location.
b. Activity.
c. Ammo status.
d. Fuel Status.
e. Equipment Status.
f. Personnel Status

____ Event 2.5: NBC Incident.
____ a. The SAFOR operator drops two volleys of artillery vic ES8280. The SAFOR operator then calls A11 on 1st Plt frequency and reports: "A11, this is A14, SHELLREP. Observed then rounds arty at ES8280." SAFOR operator waits until acknowledged, or until one minute passes, and then continues: "A11, this is A14, follow-up to SHELLREP, observing a gaseous mist vic of arty impacts at ES8280." Wait one minute, then: "A11, this is A13, have identified gas as "VX" Nerve Agent, using M8 paper and M256."
b. Unit sends NBC-1 Report:
(1) BRONZE (location of unit).
(2) Grid (or Magnetic) 1600-2400 mils.
(3) Time Attack Started.
(4) Time Attack Ended.

(5) Location of attack: ES8280.
(6) Means of delivery
Artillery.
(7) Agent: Nerve.
(8) No. of shells: 10.

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

PHASE II: Unit Receives FRAGO to Move To, Seize OBJ SILVER.

(T+1:00)

Segment A: Unit Receives FRAGO #1

Event 1: FRAGO #1 TO OPORD 9-20

a. Para. 1: TF 1-91 HAS BEEN HELD ON OUR EASTERN FLANK NEAR PL JIM. AN ENEMY TANK CO. (+) IS WITHDRAWING TO THE SOUTHEAST.

b. Para. 2: MOVE TO CONTACT AT OBJ SILVER TO DESTROY WITHDRAWING ENEMY UNIT.

c. Para. 3a: AREA OF OPS:

(1) BOUNDARIES: NE-RJ ES946804
SE-RJ ES929742
NW-RJ ES830831
SW-RJ ES802781
(2) WEST BOUNDARY IS PL PAULA
(3) EAST BOUNDARY IS PL MIKE
(4) PL PAM IS ROAD ES878821 TO ES843769
(5) CP 20 - RJ ES847790
(6) CP 21 - HILLTOP ES874788
(7) CP 24 - RJ ES8978
(8) CENTER MASS OBJ SILVER - ES905784.

d. Para. 3b.: A CO. LEADS BATTALION DIAMOND AS ADVANCED GUARD. TM. B FOLLOWS ON S. FLANK, TM C IN THE NORTH, AND D CO. TRAILING. A CO. CROSS LD AT (T+1:15) AND MOVES THROUGH CP 20 AND 21 TO SEIZE CP 24.

Event 2: Co. Cdr. issues Co. FRAGO and movement instructions.

a. Co. Cdr. orders Co. to move out.

(T1:15) Event 3: Unit crosses PL PAULA.
a. Co. Cdr. reports crossing PL PAULA.

(T+1:20)

Segment B: Unit Encounters Enemy En Route to OBJ SILVER.

Event 1: Enemy Plt at Hill 250 (vic ES874788) observes unit.
a. MR Plt engages Unit with indirect fire.
b. Unit sends SHELLREP.

Event 2: Intel Update received from Bn. Cdr. (Scouts).
a. "A06, this is Y03, scouts report minefield vic. ES876788 to ES879791. Also report two BMPs vic. ES874787."
b. Co. Cdr. notes this information, records it on paper or display, and passes it to his platoons.

Event 3: Unit crosses PL PAM, encounters MR Plt.

(T+1:30)
a. Unit reports crossing PL PAM, and crossing time.
b. Unit fights and destroys MR Plt.
c. Co. Cdr. sends CONTACT Report on three BMPs.
d. Co. Cdr. follows up CONTACT Report with SPOTREP:
(1) three BMPs, six howitzers
(2) vic. ES874787
(3) Hasty Defense
(4) Destroyed
(5) Unit location, continuing mission.
e. Radio Traffic: "A06, this is Y03, enemy tank company has passed the OBJ and is now vic. ES9972. 1-10 ARMOR will consolidate on OBJ SILVER. New orders follow. Be prepared to move within ten minutes of receipt of orders. Send SITREP. Acknowledge, over."

(T+1:45)

Segment C: Consolidation and Reorganization.

Event 1: Unit Consolidates and Reorganizes on OBJ SILVER.

Event 2: Unit Reports
SPOTREP: Destroyed, two trucks, one recovery vehicle.

(T+1:50) Event 3: Situational Awareness Assessment.

PHASE III: Unit Receives FRAGO #2, to Seize OBJ GOLD.

(T+2:00)

Segment A: Unit Receives FRAGO #2.

Event 1: FRAGO #2 to OPORD 9-20

a. Para 1: TF 1-91 HAS ELIMINATED RESISTANCE AT PL JIM AND IS READY TO CONTINUE MOVEMENT.

b. Para 2: 1-10 ARMOR CONDUCTS MOVEMENT TO CONTACT TO OBJ GOLD TO MAINTAIN PRESSURE ON WITHDRAWING ENEMY.

c. Para 3a: AREA OF OPS:

(1) BOUNDARIES: NW-Hilltop ES875788
NE-RJ ES914782
SE-RJ ES912690
SW-RJ ES842702

(2) NORTH BOUNDARY IS LD/PL TAMMY-ES875788-ES914782.

(3) SOUTH BOUNDARY OS LOA/PL LISA - ES842702-ES912690.

(4) CP 31 - ROAD BEND ES888753

(5) CP 32 - HILLTOP ES866732

(6) PL FORD ES911726 to ES852735

(7) CP 33 - HILLTOP ES883699

(8) CENTER MASS OBJ GOLD - ES880700

d. Para 3b: A CO. LEADS BATTALION DIAMOND AS ADVANCED GUARD. TM B FOLLOWS ON WEST FLANK, TM C IN THE EAST, AND D CO. TRAILING. A CO. CROSSES LD AT (T+2:15), MOVING WEST OF CP 31 AND THROUGH CP 32, TO SEIZE OBJ GOLD.

Event 2: Co. Cdr. posts FRAGO information to his map, and issues a Co. FRAGO to plts.

a. Co. Cdr. issues movement instructions and control measures (waypoints).
b. Co. Cdr. orders company to move out.

(T+2:15) Event 3: Company passes PL TAMMY.
a. Unit reports crossing PL TAMMY.
b. Unit encounters dead vehicles.
(1) Unit sends SPOTREP.
(2) Unit correctly IDs vehicles as dead (Does not engage them).
c. Unit passes PL FORD, reports doing so.

(T+2:20)
Segment B: Unit Moves To, Fights For OBJ GOLD.
Event 1: Unit Encounters Enemy Plt.
a. Unit receives Indirect Fire.
b. Unit sends SHELLREP.
c. Unit comes under Direct and Indirect Fire.
(1) Unit sends CONTACT Report.
(2) Co. Cdr. sends CFF.
(3) Unit engages Enemy with direct and indirect fire, attacks by fire and maneuver to destroy enemy.
d. Co. Cdr. follows up CONTACT Report with SPOTREP:
(1) Destroyed three tanks
(2) Location
(3) Hasty Defense
(4) Unit location and activity/ continuing mission.
Event 2: Unit Receives Orders.
"A06, this is Y03, an Enemy counterattack of tank battalion (+) size is reported heading north toward OBJ GOLD. Maintain hasty defense at OBJ GOLD and defeat this counterattack."
(T+2:40) Event 3: Unit Consolidates and Reorganizes on OBJ GOLD.
a. Unit sends SITREP:
(1) Unit Location
(2) Activity
(3) Ammo Status
(4) Fuel Status

(5) Equipment Status
(6) Personnel Status

b. Unit prepares to defend OBJ GOLD.
(1) Co. Cdr. positions plts, designates plt sectors of fire.
(2) Co. Cdr. designates engagement criteria.
(3) PLs assign tank positions, sectors, and explain engagement criteria.

(T+2:50) c. Situational Awareness Assessment

(T+3:00)

//////////////////////////// ENDEX ////////////////////////////

APPENDIX B

Raw Data on Message Type Utilization, Composition Times, and Messages Passed Along

In the accompanying tables, usage of various types of messages is tabulated for each phase of each experiment. The experiment number will end in A_O_nn, where nn ranges from 10 to 15, for exercises using the offensive scenario, and will end in A_D_nn for exercises using the defensive scenario. The type of message is listed across the top and the net (i.e. Battalion net, Company net or Platoon net) on when the message is broadcast is indicated along the left side. The numbers in the cells are simply counts of the total number of messages of that type broadcast on that net during the indicated phase of each experiment. Below the message counts, and a total for each type, several other measures are tabulated. The first, labeled *# orig rpts*, is the number of those messages that were original messages (i.e. excluding those received and passed along). The next, labeled *# manned sims*, is the number of those messages originating in the manned simulators and, therefore, for which *time to compose* and *time to send* can be measured. These two represent the total time for all the messages originating from manned simulators, in seconds, between the time the message originators began to compose the messages and the time they finished composing them, or the time they actually sent them out. The next item, labeled *# Sent Up*, represents the number of messages of each type passed along to higher echelons, and *# Sent Down* similarly represents those messages passed along to lower echelons.

Message Utilization

	Adjust Fire	Ammo Status	CFF	Contact Rept	Shell Rept	SitRep	Spot Rept	Intel Rept	Frago	NBC Rept	Route	TOTAL
Exercise CV_0405_A_D_10 Phase 1												
Bn Net	1			4	2	1	4	1		1		14
Co Net				4	6		5	2		1		18
Plt 1 Net				1	7		1					9
Plt 2 Net	4			3	4		5	2			4	22
Plt 3 Net				2	7		3	2			1	15
TOTAL	5	0	0	14	26	1	18	7	0	2	5	78
# orig rpts	3	0	0	5	17	1	8	2	0	1	0	37
# manned sims	1	0	0	2	3	1	4	0	0	1	0	12
time to comp	17			38	63	56	216			58		448
time to send	22			56	82	60	855			67		1142
# Sent Up	0	0	0	3	4	0	3	0	0	1	0	11
# Sent Down	0	0	0	1	0	0	2	3	0	1	0	7
Exercise CV_0405_A_D_10 Phase 2												
Bn Net	5		2	6		1	2	3	1			20
Co Net		1	1	5	2	2	2	3	1			17
Plt 1 Net				1			4					5
Plt 2 Net	1	2		2	4	2	4	1	1		2	19
Plt 3 Net				1				1	1			3
TOTAL	6	3	3	15	6	5	12	8	4	0	2	64
# orig rpts	6	3	2	6	5	5	8	3	1	0	0	39
# manned sims	5	3	2	4	3	4	3	0	0	0	0	24
time to comp	63	16	32	124	135	178	163					711
time to send	97	29	44	252	201	201	358					1162
# Sent Up	0	0	1	4	2	0	2	0	0	0	0	9
# Sent Down	0	0	0	1	0	0	0	5	2			8
Exercise CV_0405_A_D_10 Phase 3												
Bn Net	6		2	5	1		2	1	1			18
Co Net	1	1		3	2		4	1	2		3	17
Plt 1 Net				5	2		22					29
Plt 2 Net	8	1	1	1	2	1	4		5		9	32
Plt 3 Net				5	3		31	1	1		2	43
TOTAL	15	2	3	19	10	1	63	3	9	0	14	139
# orig rpts	13	2	3	14	8	1	57	1	1	0	0	260
# manned sims	13	2	3	4	2	1	4	0	0	0	0	29
time to comp	399	51	42	109	31	57	255					944
time to send	588	61	61	531	44	64	279					1628
# Sent Up	1	0	0	3	1	0	2	0	0	0	0	7
# Sent Down	0	0	0	0	0	0	0	2	2			4
Exercise CV_0406_A_O_10 Phase 1												
Bn Net	4		2	7	2	1	11	1		1		29
Co Net	1			6	3	3	11	1	1	3		29
Plt 1 Net				10	8		29					47
Plt 2 Net	3	1		3	2	2	3	1	1	1	5	22
Plt 3 Net				4	8		30	1	1	2	2	48
TOTAL	8	1	2	30	23	6	84	4	3	7	7	175
# orig rpts	6	1	2	16	18	6	63	1	1	1	0	115
# manned sims	6	2	2	2	2	9	4	0	0	1	0	28
time to comp	349	8	39	85	29	514	215			92		1331
time to send	3072	16	46	94	41	559	252			98		4178
# Sent Up	1	0	0	4	3	0	11	0	0	1	0	20
# Sent Down	0	0	0	0	0	0	0	2	1	1	0	4

Message Utilization

	Adjust Fire	Ammo Status	CFF	Contact Rept	Shell Rept	SitRep	Spot Rept	Intel Rept	Frago	NBC Rept	Route	TOTAL
Exercise CV_0406_A_O_10 Phase 2												
Bn Net				3	1	1	2	2	1			10
Co Net				3	3	1	3	1	1			12
Plt 1 Net				1	2		11					14
Plt 2 Net	1	2		2	2	3	1	2	2		4	19
Plt 3 Net				4	2		16	1	1		1	25
TOTAL	1	2	0	13	10	5	33	6	5	0	5	80
# orig rpts	1	2	0	8	7	5	30	2	1	0	0	56
# manned sims	0	2	0	3	3	5	3	0	0	0	0	16
time to comp		17		145	60	232	153					607
time to send		26		174	78	253	170					701
# Sent Up	0	0	0	3	2	0	3	0	0	0	0	8
# Sent Down	0	0	0	0	0	0	0	2	2	0	0	4
Exercise CV_0406_A_O_10 Phase 3												
Bn Net	1		1	5		1	2	1	1			12
Co Net				6	1	1	2	1	1			12
Plt 1 Net				3	2		18					23
Plt 2 Net				5	2		1	1	2		5	16
Plt 3 Net				4	3		14	1	1		1	24
TOTAL	1	0	1	23	8	2	37	4	5	0	6	87
# orig rpts	1	0	1	9	7	1	22	1	1	0	0	43
# manned sims	1	0	1	4	2	2	1	0	0	0	0	11
time to comp	17		10	85	28	186	53					379
time to send	22		15	116	43	195	65					456
# Sent Up	0	0	0	0	5	1	0	2	0	0	0	8
# Sent Down	0	0	0	3	0	0	1	2	2	0	0	8
Exercise CV_0419_A_O_12 Phase 1												
Bn Net	11		8	7	3	4	11	1		3		48
Co Net	1	3	3	10	9	4	17	3		8		58
Plt 1 Net				16	18	1	22			1		58
Plt 2 Net	2	4	4	5	4	1	4	2		4	1	31
Plt 3 Net				5	8		10	3		1		27
TOTAL	14	7	15	43	42	10	64	9	0	17	1	222
# orig rpts	11	7	9	22	25	9	33	1	0	3	0	120
# manned sims	4	7	9	8	6	9	7	0	0	3	0	53
time to comp	103	201	193	267	104	703	1031			248		2850
time to send	103	1471	193	267	104	1381	1031			249		4799
# Sent Up	1	0	3	8	8	0	14	0	0	2	0	36
# Sent Down	0	0	0	2	2	1	1	2	0	1	0	9
Exercise CV_0419_A_O_12 Phase 2												
Bn Net			3			2		2	1			8
Co Net				3	7	2	6	2	1			21
Plt 1 Net				2	8		7	1	1			19
Plt 2 Net				1	3		1	2	1		1	9
Plt 3 Net					1		3	2	1		2	9
TOTAL	0	0	3	6	19	4	17	9	5	0	3	66
# orig rpts	0	0	3	3	12	4	10	2	1	0	0	35
# manned sims	0	0	3	3	5	4	3	0	0	0	0	18
time to comp			110	83	96	619	254					1162
time to send			110	83	96	619	746					1654
# Sent Up	0	0	0	0	2	0	4	0	0	0	0	6
# Sent Down	0	0	0	2	2	0	1	4	1	0	0	10

Message Utilization

	Adjust Fire	Ammo Status	CFF	Contact Rept	Shell Rept	SitRep	Spot Rept	Intel Rept	Frago	NBC Rept	Route	TOTAL
Exercise CV_0419_A_O_12 Phase 3												
Bn Net	8		3	1	1	4	3	1	1			22
Co Net		2		5	5	2	18	1	1			34
Plt 1 Net				3	4		18	1	1		1	28
Plt 2 Net		3			5	5			1		1	15
Plt 3 Net				1	3		9		1			14
TOTAL	8	5	3	10	18	11	48	3	5	0	2	113
# orig rpts	8	5	3	5	14	10	26	1	1	0	0	73
# manned sims	8	5	3	2	8	11	3					40
time to comp	180	48	70	39	189	712	227					1465
time to send	221	48	70	39	1669	780	710					3537
# Sent Up	0	0	0	2	3	0	15	0	0	0	0	20
# Sent Down	0	0	0	1	1	0	1	2	2	0	0	7
Exercise CV_0420_A_D_12 Phase 1												
Bn Net	2		1	7	2	3	3	2	1	1		22
Co Net				10	14	1	10	2	1	6		44
Plt 1 Net				4	8		6	2	1			21
Plt 2 Net		5		2	3	1	4	2	1	1	2	21
Plt 3 Net				2	4		1	2	1			10
TOTAL	2	5	1	25	31	5	24	10	5	8	2	118
# orig rpts	2	5	1	12	18	5	17	2	1	3	0	66
# manned sims	2	5	1	8	6	5	10			3		40
time to comp	56	65	43	530	188	412	801			171		2266
time to send	56	66	43	2231	495	495	1610			172		5168
# Sent Up	0	0	0	6	9	0	5	0	0	1	0	21
# Sent Down	0	0	0	1	0	0	1	2	1	0	0	5
Exercise CV_0420_A_D_12 Phase 2												
Bn Net	4		6	1	2	2	1	2	1			19
Co Net	2		6	5	16		8	1	1			39
Plt 1 Net				2	6		3	1	1		1	14
Plt 2 Net	5	5	3	2	6	3	2	1	2		1	30
Plt 3 Net				1	7		3	1	1		1	14
TOTAL	11	5	15	11	37	5	17	6	6	0	3	116
# orig rpts	8	5	8	7	23	5	13	2	1			72
# manned sims	5	5	7	5	10	5	6					43
time to comp	143	31	111	75	495	236	490					1581
time to send	144	32	112	75	2416	236	1030					4045
# Sent Up	2	0	4	1	7	0	4	0	0	0	0	18
# Sent Down	0	0	0	1	0	0	0	1	1	0	0	3
Exercise CV_0420_A_D_12 Phase 3												
Bn Net	1		2	2		2	1	2	1			11
Co Net		1		8	11	2	12	1	1			36
Plt 1 Net				7	12		18	1	1			39
Plt 2 Net				4	3	2		2	4		5	20
Plt 3 Net				5	14		25	1	1			46
TOTAL	1	1	2	26	40	6	56	7	8	0	5	152
# orig rpts	1	1	2	17	32	6	45	3	1			108
# manned sims	1		2	7	6	6	3	1	1			27
time to comp	36		62	264	1341	235	192	57	86			2273
time to send	36		62	265	1658	235	192	57	86			2591
# Sent Up	0	0	0	7	6	1	5	0	0	1	0	20
# Sent Down	0	0	0	0	0	0	0	1	0	1	0	2

Message Utilization

	Adjust Fire	Ammo Status	CFF	Contact Rept	Shell Rept	SitRep	Spot Rept	Intel Rept	Frago	NBC Rept	Route	TOTAL
Exercise CV_0426_a_o_13 Phase 1												
Bn Net			2	8	1	3	4	1		1		20
Co Net				10	6	1	5	1		1	4	28
Plt 1 Net				2	6		3				2	13
Plt 2 Net					3		2	1			4	10
Plt 3 Net				1	7		8					16
TOTAL	0	0	2	21	23	4	22	3	0	2	10	87
# orig rpts			2	9	16	3	12	1		1		44
# manned sims			2	6	3	3	1			1		16
time to comp			48	124	82	166	106			132		658
time to send			48	124	82	166	106			132		658
# Sent Up	0	0	0	7	6	1	5	0	0	1	0	20
# Sent Down	0	0	0	0	0	0	0	1	0	1	0	2
Exercise CV_0426_a_o_13 Phase 2												
Bn Net			1	3	2	2	3	2	1			14
Co Net	1		2	4	2	7	2	2	1	1		22
Plt 1 Net				1	3		2	1	1		2	10
Plt 2 Net			1	1	1		2	1	1	1	4	12
Plt 3 Net				1	3		7		1			12
TOTAL	1	0	4	10	11	9	16	6	5	2	6	70
# orig rpts	1		1	5	9	7	13	2	1	1		40
# manned sims	2		2	3	3	6	4		1	1		22
time to comp	43		29	76	56	348	306		85	69		1012
time to send	43		30	76	56	348	438		85	69		1145
# Sent Up	0	0	1	4	2	1	1	0	0	0	0	9
# Sent Down	0	0	1	0	0	0	0	2	1	1	0	5
Exercise CV_0426_a_o_13 Phase 3												
Bn Net	1		1	3	5	1	1	1	1			14
Co Net	1		1	4	5		2					13
Plt 1 Net				1	2		3		2		3	11
Plt 2 Net	1		1	1	1			1	1		5	11
Plt 3 Net				1	2		3		2			8
TOTAL	3	0	3	10	15	1	9	2	6	0	8	57
# orig rpts	1		1	2	10	1	7	1	2			25
# manned sims	1		1	1	5	1	1		1			11
time to comp	57		15	124	87	47	44		15			389
time to send	57		15	124	139	48	44		15			442
# Sent Up	1	0	1	2	3	0	2	0	0	0	0	9
# Sent Down	0	0	0	0	0	0	0	1	1	0	0	2
Exercise CV_0427_A_D_13 Phase 1												
Bn Net	5		10	5	7	3	1	2		1		34
Co Net	2		3	6	12	1	1	3	4	1	1	34
Plt 1 Net				3	6		1				3	13
Plt 2 Net				2	3	1		5	2		1	14
Plt 3 Net				2	8		2		1			13
TOTAL	7	0	13	18	36	5	5	10	7	2	5	108
# orig rpts	6	0	12	9	21	3	3	2	1	2	0	59
# manned sims	3		12	3	7	3				2		30
time to comp	68		868	472	139	152				124		1823
time to send	88		960	872	209	1376				246		3751
# Sent Up	0	0	1	6	11	1	1	0	1	0	0	21
# Sent Down	0	0	0	0	0	0	0	4	0	0	0	4

Message Utilization

	Adjust Fire	Ammo Status	CFF	Contact Rept	Shell Rept	SitRep	Spot Rept	Intel Rept	Frago	NBC Rept	Route	TOTAL
Exercise CV_0427_A_D_13 Phase 2												
Bn Net	2		2	4	5	2	2	3	1			21
Co Net			2	6	8		3	1	1			21
Plt 1 Net				4	6		6				1	17
Plt 2 Net					2		1	1	1		2	7
Plt 3 Net				4	7		16					27
TOTAL	2	0	4	18	28	2	28	5	3	0	3	93
# orig rpts	2	0	4	9	17	2	23	3	1	0	0	17
# manned sims	1		4	1	4	2	1					13
time to comp	5		58	11	163	131	11					379
time to send	26		58	11	1129	760	116					2100
# Sent Up	0	0	0	5	8	0	1	0	0	0	0	14
# Sent Down	0	0	0	0	0	0	0	2	2	0	0	4
Exercise CV_0427_A_D_13 Phase 3												
Bn Net	7		14	3	9	1		1	1			36
Co Net	5		9	3	10		1	1	1		2	32
Plt 1 Net				1	6		3				1	11
Plt 2 Net				1	2	1	3	1	2		2	12
Plt 3 Net				1	4		1					
TOTAL	12	0	23	9	31	2	8	3	4	0	5	91
# orig rpts	9	0	15	6	18	2	7	1	1	0	0	59
# manned sims	3		14	3	8	2	2		1	1		34
time to comp	35		325	62	183	179	126		70	80		1060
time to send	273		489	62	183	275	126		70	80		1558
# Sent Up	3	0	8	2	10	0	1	0	0	0	0	24
# Sent Down	0	0	0	0	0	0	0	1	1	0	0	2
Exercise CV_0502_A_D_14 Phase 1												
Bn Net			7	7	13	4		2		1		34
Co Net	9	1	14	16	26	1	6	2		1		76
Plt 1 Net				2	12	4	4	2				24
Plt 2 Net	8		6	7	23		5	9	7	1	1	67
Plt 3 Net				3	8		2	2	1			16
TOTAL	17	1	27	35	82	9	17	17	8	3	1	217
# orig rpts	14	1	14	15	38	9	9	2	1	1	0	104
# manned sims	14	1	14	10	18	9	3	0	0	1	0	70
time to comp	364	6	804	428	463	451	182			59		2757
time to send	444	6	839	428	2746	1585	182			59		6289
# Sent Up	2	0	10	9	14	0	4	0	0	1	0	40
# Sent Down	0	0	0	4	1	0	1	4	0	1	0	11
Exercise CV_0502_A_D_14 Phase 2												
Bn Net	1		3	3		2	10	2	1			22
Co Net	6		8	7	3		15	2	1			42
Plt 1 Net				4	4		23	1	1			33
Plt 2 Net	5		3	5	6	1	10	3	3		1	37
Plt 3 Net				3	4		25	1	1			34
TOTAL	12	0	14	22	17	3	83	9	7	0	1	168
# orig rpts	10	0	8	14	15	3	52	2	1	0	0	105
# manned sims	8	0	7	6	6	3	4	0	0	0	0	377
time to comp	206		550	286	218	151	285					721
time to send	206		1561	564	234	152	293					1405
# Sent Up	1	0	4	2	2	0	10	0	0	0	0	19
# Sent Down	0	0	0	1	0	0	0	4	2	0	0	7

Message Utilization

	Adjust Fire	Ammo Status	CFF	Contact Rept	Shell Rept	SitRep	Spot Rept	Intel Rept	Frago	NBC Rept	Route	TOTAL
Exercise CV_0502_A_D_14 Phase 3												
Bn Net	1		5	8	3	1	1	1	1			21
Co Net	5	3	6	12	9	1	1	1	1			39
Plt 1 Net				2	4			1	1			8
Plt 2 Net	6		5	6	9		1	1	2		2	32
Plt 3 Net				2	4		1		1			8
TOTAL	12	3	16	30	29	2	4	4	6	0	2	108
# orig rpts	11	3	9	8	17	2	3	1	1	0	0	55
# manned sims	10	3	9	3	9	2	2	0	1	0	0	39
time to comp	110	16	198	79	213	77	100		88			881
time to send	186	16	1937	347	404	77	100		88			3155
# Sent Up	1	0	5	6	3	0	1	0	0	0	0	16
# Sent Down	0	0	0	0	0	0	0	2	2	0	0	4
Exercise CV_0503_A_O_14 Phase 1												
Bn Net				8	4	2	9	1		1		25
Co Net	1	1	2	23	14	2	31	1		2		77
Plt 1 Net				8	11		40	1				60
Plt 2 Net				9	17	1	5	1		1		34
Plt 3 Net				7	12		44	1		1		65
TOTAL	1	1	2	55	58	5	129	5	0	5	0	261
# orig rpts	1	1	2	20	38	5	85	1	0	1	0	154
# manned sims	1	1	1	7	15	5	1	0	0	1	0	32
time to comp	8	7	19	172	395	393	91			60		1145
time to send	8	7	19	172	395	409	91			60		1161
# Sent Up	0	0	0	13	9	0	26	0	0	1	0	49
# Sent Down	0	0	0	0	0	0	0	2	0	1	0	3
Exercise CV_0503_A_O_14 Phase 2												
Bn Net			4	1		1	3	2	1			12
Co Net	4		6	6			7	2	1		1	27
Plt 1 Net				4	4		13	2	1			24
Plt 2 Net	4		2	1	2		1	2	2		1	15
Plt 3 Net				1	4		8	1	1		1	16
TOTAL	8	0	12	13	10	1	32	9	6	0	3	94
# orig rpts	7	0	4	8	10	1	22	2	1	0	0	55
# manned sims	9	0	3	3	2	1	1	0	0	0	0	19
time to comp	105		46	333	34	69	65					652
time to send	105		46	964	34	69	65					1283
# Sent Up	1	0	4	4	0	0	7	0	0	0	0	16
# Sent Down	0	0	0	0	0	0	1	4	2	0	0	7
Exercise CV_0503_A_O_14 Phase 3												
Bn Net	3		2	4		2	1	1	1			14
Co Net	4	2	2	6	3	1	10	1	1		2	32
Plt 1 Net					5		5	1	1		1	13
Plt 2 Net	2		2	5	10	3	1	5	2		2	32
Plt 3 Net					4		5	1	1		1	12
TOTAL	9	2	6	15	22	6	22	9	6	0	6	103
# orig rpts	6	2	3	5	16	6	11	2	1	0		52
# manned sims	6	2	3	4	7	6	0	0	0	0	0	28
time to comp	67	9	44	381	124	320						945
time to send	352	9	44	381	124	321						1231
# Sent Up	3	0	2	4	33	0	6	0	0	0	0	48
# Sent Down	0	0	0	2	0	0	0	1	1	0	0	4

Message Utilization

	Adjust Fire	Ammo Status	CFF	Contact Rept	Shell Rept	SitRep	Spot Rept	Intel Rept	Frago	NBC Rept	Route	TOTAL
Exercise CV_0510_A_D_15 Phase 1												
Bn Net	4		9	3	5	1	2	2		1		27
Co Net	14		10	4	9	5		4	1	3		50
Plt 1 Net				4	7			3				14
Plt 2 Net		1	1	1	4	3	2	4	3		1	20
Plt 3 Net				1	8							9
TOTAL	18	1	20	13	33	9	4	13	4	4	1	120
# orig rpts	15	1	13	8	23	9	3	2	1	1	0	76
# manned sims	14	2	13	3	8	11	2	0	0	1	0	54
time to comp	694	26	494	127	161	973	127			95		2697
time to send	900	39	478	177	161	973	127			95		2950
# Sent Up	3	0	7	4	8	0	0	0	0	1	0	23
# Sent Down	0	0	0	0	0	0	0	4	1	0	0	5
Exercise CV_0510_A_D_15 Phase 2												
Bn Net	5		5		3	1		2	1			17
Co Net	8		6	1	4	2	4	1	2			28
Plt 1 Net				3	7		34		2		2	48
Plt 2 Net				3	8	1	1		4		4	21
Plt 3 Net				5	5		18					28
TOTAL	13	0	11	12	27	4	57	3	9	0	6	142
# orig rpts	8	0	6	9	20	4	53	2	1	0	0	103
# manned sims	8	0	6	1	8	8	1	0	1	0	0	33
time to comp	116		467	18	2282	361	44		82			3370
time to send	116		3137	18	3619	370	44		82			7386
# Sent Up	5	0	5	1	3	0	4	0	0	0	0	18
# Sent Down	0	0	0	0	0	0	0	1	2	0	0	3
Exercise CV_0510_A_D_15 Phase 3												
Bn Net	7		6	5	8			1	2			29
Co Net	3		4	8	9	2		2	4			32
Plt 1 Net				2	3		1	3	3		1	13
Plt 2 Net			1	3	13	4	1	2	5		2	31
Plt 3 Net				1	5		1		1			8
TOTAL	10	0	11	19	38	6	3	8	15	0	3	113
# orig rpts	7	0	9	5	23	5	3	2	2	0	0	56
# manned sims	7	0	9	2	14	6	1	1	0	0	0	40
time to comp	72		665	60	460	222	81	142				1702
time to send	311		1129	848	485	223	81	142				3219
# Sent Up	3	0	2	2	8	1	0	0	0	0	0	16
# Sent Down	0	0	0	1	0	0	0	2	2	0		5
Exercise CV_0511_A_O_15 Phase 1												
Bn Net	3		1	4	7	1	4	1		2		23
Co Net	2			8	8	5	7	2		5		37
Plt 1 Net				3	6		8	4		2		23
Plt 2 Net	2		2		7	7		2		1		21
Plt 3 Net				3	6		10					19
TOTAL	7	0	3	18	34	13	29	9	0	10	0	123
# orig rpts	3	0	2	6	24	12	20	3	0	1	0	71
# manned sims	2	0	1	0	13	10	2	2	0	1	0	31
time to comp	65		17		362	983	106	162		108		1803
time to send	65		17		378	1100	106	162		108		1936
# Sent Up	2	0	0	3	8	1	4	0	0	1	0	19
# Sent Down	0	0	0	0	0	0	0	2	0	1	0	3

Message Utilization

	Adjus' Fire	Ammo Status	CFF	Contact Rept	Shell Rept	SitRep	Spot Rept	Intel Rept	Frago	NBC Rept	Route	TOTAL
Exercise CV_0511_A_O_15 Phase 2												
Bn Net				2		2	4	2	1			11
Co Net				2	4	2	6	1	1			16
Plt 1 Net				1	3		3	1	1			9
Plt 2 Net		1			4	3		1	1	3		13
Plt 3 Net				2	3		4					9
TOTAL	0	1	0	7	14	7	17	5	4	3	0	58
# orig rpts	0	1	0	3	11	6	9	2	1	0	0	33
# manned sims	0	1	0	0	5	6	2	0	0	0	0	16
time to comp		7			112	421	72					612
time to send		7			112	423	72					614
# Sent Up	0	0	0	1	3	1	4	0	0	0	0	9
# Sent Down	0	1	0	3	11	6	9	2	1	0	0	33
Exercise CV_0511_A_O_15 Phase 3												
Bn Net	1		2	2		1	5	1	1			13
Co Net			1	4	3	4	7	1	1		1	22
Plt 1 Net				7	6		23	1	1		2	40
Plt 2 Net		1	1	1	5	6		1	1		2	18
Plt 3 Net				7	5		12					24
TOTAL	1	1	4	21	19	11	47	4	4	0	5	117
# orig rpts	1	1	2	15	15	8	37	1	1	0	0	81
# manned sims	0	1	2	1	4	8	3	0	1	0	0	20
time to comp		6	53	123	75	472	126		58			913
time to send		6	53	123	75	864	127		58			1306
# Sent Up	0	0	1	4	1	1	5	0	0	0	0	12
# Sent Down	0	0	0	0	0	0	0	2	2	0	0	4
Exercise CV_0511_A_O_15 Phase 1												
Bn Net	3		1	4	7	1	4	1		2		23
Co Net	2			8	8	5	7	2		5		37
Plt 1 Net				3	6		8	4		2		23
Plt 2 Net	2		2		7	7		2		1		21
Plt 3 Net				3	6		10					19
TOTAL	7	0	3	18	34	13	29	9	0	10	0	123
# orig rpts												
# manned sims	2		1		13	10	2	2	0	1	0	31
time to comp	65		17		362	983	106	162		108		1803
time to send	65		17		378	1100	106	162		108		1936
# Sent Up												
# Sent Down												
Exercise CV_0511_A_O_15 Phase 2												
Bn Net				2		2	4	2	1			11
Co Net				2	4	2	6	1	1			16
Plt 1 Net				1	3		3	1	1			9
Plt 2 Net		1			4	3		1	1		3	13
Plt 3 Net				2	3		4					9
TOTAL	0	1	0	7	14	7	17	5	4	0	3	58
# orig rpts												
# manned sims	0	1	0	0	5	8	2	0	0	0	0	16
time to comp		7			112	421	72					612
time to send		7			112	423	72					614
# Sent Up												
# Sent Down												

Message Utilization

	Adjust Fire	Ammo Status	CFF	Contact Rept	Shell Rept	SitRep	Spot Rept	Intel Rept	Frago	NBC Rept	Route	TOTAL
Exercise CV_0511_A_O_15 Phase 3												
Bn Net	1		2	2		1	5	1	1			13
Co Net			1	4	3	4	7	1	1		1	22
Plt 1 Net				7	6		23	1	1		2	40
Plt 2 Net		1	1	1	5	6		1	1		2	18
Plt 3 Net				7	5		12					24
TOTAL	1	1	4	21	19	11	47	4	4	0	5	117
# orig rpts												
# manned sims	0	1	2	1	4	8	3	0	1	0	0	20
time to comp		6	53	123	75	472	126		58			913
time to send		6	53	123	75	484	127		58			926
# Sent Up												
# Sent Down												

APPENDIX C

Summaries of Message Type Utilization, Average Composition Times, and Percentage of Messages Passed Along

In the accompanying tables, usage of various types of messages is tabulated for each experiment. The experiment number will end in A_O_nn, where nn ranges from 10 to 15, for exercises using the offensive scenario, and will end in A_D_nn for exercises using the defensive scenario. The type of message is listed across the top and various measures are indicated along the left side. The first row gives the total number of messages of each type used in the course of the entire experiment, and under that is the percentage of all messages used in that experiment that were of a particular type. The next row, labeled *# orig rpts*, is the number of those messages that were original messages (i.e. excluding those received and passed along), followed by the percentage of all messages of that type that were original messages. The next, labeled *# manned sims*, is the number of those messages originating in the manned simulators and, therefore, for which *time to compose* and *time to send* can be measured. These two represent the total time for all the messages originating from manned simulators, in seconds, between the time the message originators began to compose the messages and the time they finished composing them, or the time they actually sent them out. *Avg.time Comp.* and *Avg.time send* are simply the arithmetic means for the experiment in question for these times. The next item, labeled *# Sent Up*, represents the number of messages of each type passed along to higher echelons, and it is followed with the percentage of messages of that type that were passed along, and the end-to-end average delay in passing them along. The last two rows represent the same data for messages passed along to lower echelons. The end-to-end delay for passing messages down was not measured.

	Adjust Fire	Ammo Status	CFF	Contact Rept	Shell Rept	SitRep	Spot Rept	Intel Rept	Frago	NBC Rept	Route	TOTAL
Summary for Exercise CV_0405_A_D_10												
TOTAL	26	5	6	48	42	7	93	18	13	2	21	281
% of Tot.	9%	2%	2%	17%	15%	2%	33%	6%	5%	1%	7%	
# orig rpts	22	5	5	25	30	7	73	6	2	1	0	176
% of Tot.	85%	100%	83%	52%	71%	100%	78%	33%	15%	50%	0%	63%
# manned sims	19	5	5	10	8	6	11	0	0	1	0	65
time to comp	479	67	74	271	229	291	634	0	0	58		2103
time to send	707	90	105	839	327	325	1492	0	0	67		3952
Avg.time Comp.	25	13	15	27	29	49	58			58		32
Avg.time send	37	18	21	84	41	54	136			67		61
# Sent Up	1	0	1	10	7	0	7	0	0	1	0	27
% Sent Up	4%	0%	17%	21%	17%	0%	8%	0%	0%	50%	0%	10%
Avg. Delay	164		19	64	43		73			52		254
# Sent Down	0	0	0	2	0	0	2	10	4	1	0	19
% Sent Down	0%	0%	0%	4%	0%	0%	2%	56%	31%	50%	0%	7%
Summary for Exercise CV_0420_A_D_12												
TOTAL	14	11	18	62	108	16	97	23	19	8	10	386
% of Tot.	4%	3%	5%	16%	28%	4%	25%	6%	5%	2%	3%	
# orig rpts	11	11	11	36	73	16	75	7	3	3	0	246
% of Tot.	79%	100%	61%	58%	68%	100%	77%	30%	16%	38%	0%	64%
# manned sims	8	10	10	20	22	16	19	1	1	3		110
time to comp	235	96	216	869	2024	883	1483	57	86	171		6120
time to send	236	98	217	2571	4569	966	2832	57	86	172		11804
Avg.time Comp.	29	10	22	43	92	55	78	57	86	57		56
Avg.time send	30	10	22	129	208	60	149	57	86	57		107
# Sent Up	2	0	4	14	22	1	14	0	0	2	0	59
% Sent Up	18%	0%	36%	39%	30%	6%	19%	0%	0%	67%	0%	24%
Avg. Delay	1.73		0.57	2.14	1.54	2.15	2.81			0.70		0.40
# Sent Down	0	0	0	2	0	0	1	4	2	1	0	10
% Sent Down				6%			1%	57%	67%	33%		4%

	Adjust Fire	Ammo Status	CFF	Contact Rept	Shell Rept	SitRep	Spot Rept	Intel Rept	Frago	NBC Rept	Route	TOTAL
Summary for Exercise CV_0427_A_D_13												
TOTAL	21	0	40	45	95	9	41	18	14	2	13	292
% of Tot.	7%	0%	14%	15%	33%	3%	14%	6%	5%	1%	4%	
# orig rpts	17		31	24	56	7	33	6	3	2	0	125
% of Tot.	81%		78%	53%	59%	78%	80%	33%	21%	100%	0%	43%
# manned sims	7		30	7	19	7	3	0	1	3	0	77
time to comp	108		1251	545	485	462	137		70	204		3262
time to send	387		1507	945	1521	2411	242		70	326		7409
Avg.time Comp.	15		42	78	26	66	46		70	68		42
Avg.time send	55		50	135	80	344	81		70	109		96
# Sent Up	3	0	9	13	29	1	3	0	1	0	0	59
% Sent Up	14%		23%	29%	31%	11%	7%	0%	7%	0%	0%	20%
Avg. Delay	26		66	130	62	294	150		2460			1436
# Sent Down	0	0	0	0	0	0	0	7	3	0	0	10
% Sent Down	0%		0%	0%	0%	0%	0%	39%	21%	0%	0%	3%
Summary for Exercise CV_0502_A_D_14												
TOTAL	41	4	57	87	128	14	104	30	21	3	4	493
% of Tot.	8%	1%	12%	18%	26%	3%	21%	6%	4%	1%	1%	
# orig rpts	35	4	31	37	70	14	64	5	3	1	0	264
% of Tot.	85%	100%	54%	43%	55%	100%	62%	17%	14%	33%	0%	54%
# manned sims	32	4	30	19	33	14	9	0	1	1	0	311
time to comp	680	22	1552	793	894	679	567	0	88	59	0	4008
time to send	836	22	4337	1339	3384	1814	575	0	88	59	0	10016
Avg. time comp	21	6	52	42	27	49	63		88	59		13
Avg. time send	26	6	145	70	103	130	64		88	59		32
# Sent Up	4	0	19	17	19	0	15	0	0	1	0	75
% Sent Up	10%	0%	33%	20%	15%	0%	14%	0%	0%	33%	0%	15%
Avg. Delay	21		93	104	80		115			263		541
# Sent Down	0	0	0	5	1	0	1	10	4	1	0	22
% Sent Down	0%	0%	0%	6%	1%	0%	1%	33%	19%	33%	0%	4%

Summary of Exercise CV_0510_A_D_15	Adjust Fire	Ammo Status	CFF	Contact Rept	Shell Rept	SitRep	Spot Rept	Intel Rept	Frago	NBC Rept	Route	TOTAL
TOTAL	41	1	42	44	98	19	64	24	28	4	10	375
% of Tot.	11%	0%	11%	12%	26%	5%	17%	6%	7%	1%	3%	
# orig rpts	30	1	28	22	66	18	59	6	4	1	0	235
% of Tot.	73%	100%	67%	50%	67%	95%	92%	25%	14%	25%	0%	63%
# manned sims	29	2	28	6	30	25	4	1	1	1	0	127
time to comp	882	26	1626	205	2903	1556	252	142	82	95		7769
time to send	1327	39	4744	1043	4265	1566	252	142	82	95		13555
Avg.time Comp.	30	13	58	34	97	62	63	142	82	95		61
Avg.time send	46	20	169	174	142	63	63	142	82	95		107
# Sent Up	11	0	14	7	19	1	4	0	0	1	0	57
% Sent Up	27%	0%	33%	16%	19%	5%	6%	0%	0%	25%	0%	15%
Avg. Delay	399		94	762	110	24	50			91		1530
# Sent Down	0	0	0	1	0	0	0	7	5	0	0	13
% Sent Down	0%	0%	0%	2%	0%	0%	0%	29%	18%	0%	0%	3%

SUMMARY FOR DEFENSIVE EXERCISES

TOTAL	143	21	163	286	471	65	399	113	95	19	58	1827
% of Tot.	8%	1%	9%	16%	26%	4%	22%	6%	5%	1%	3%	
# orig rpts	115	21	106	144	295	62	304	30	15	8	0	1046
% of Tot.	6%	1%	6%	8%	16%	3%	17%	2%	1%	0%	0%	57%
# manned sims	95	21	103	62	112	68	46	2	4	9	0	690
time to comp	1930	157	4660	2439	6335	3629	2497	199	326	587	0	21191
time to send	3493	249	10910	6737	14066	7082	5393	199	326	719	0	46736
Avg.time Comp.	20	7	45	39	57	53	54	100	82	65		31
Avg.time send	37	12	106	109	126	104	117	100	82	80		68
# Sent Up	21	0	47	61	96	3	43	0	1	5	0	277
% Sent Up	15%	0%	29%	21%	20%	5%	11%	0%	1%	26%		
Avg. Delay	225		79	155	60	107	68			81		792
# Sent Down	0	0	0	10	1	0	4	38	18	3	0	74
% Sent Down	0%	0%	0%	3%	0%	0%	1%	34%	19%	16%	0%	4%

	Adjust Fire	Ammo Status	CFF	Contact Rept	Shell Rept	SitRep	Spot Rept	Intel Rept	Frago	NBC Rept	Route	TOTAL
Summary for Exercise CV_0406_A_O_10												
TOTAL	10	3	3	66	41	13	154	14	13	7	18	342
% of Tot.	3%	1%	1%	19%	12%	4%	45%	4%	4%	2%	5%	
# orig rpts	8	3	3	33	32	12	115	4	3	1	0	214
% of Tot.	80%	100%	100%	50%	78%	92%	75%	29%	23%	14%	0%	63%
# manned sims	7	4	3	9	7	16	8	0	0	1		55
time to comp	366	25	49	315	117	932	421	0	0	92		2317
time to send	3094	42	61	384	162	1007	487	0	0	98		5335
Avg.time Comp.	52	6	16	35	17	58	53			92		42
Avg.time send	442	11	20	43	23	63	61			98		97
# Sent Up	1	0	0	7	10	1	14	2	0	1	0	36
% Sent Up	10%	0%	0%	11%	24%	8%	9%	14%	0%	14%	0%	11%
Avg. Delay	142			89	51	60	7	70		0		295
# Sent Down	0	0	0	3	0	0	1	6	5	1	0	16
% Sent Down	0%	0%	0%	5%	0%	0%	1%	43%	38%	14%	0%	5%
Summary for Exercise CV_0419_A_O_12												
TOTAL	22	12	21	59	79	25	129	21	10	17	6	401
% of Tot.	5%	3%	5%	15%	20%	6%	32%	5%	2%	4%	1%	
# orig rpts	19	12	15	30	51	23	69	4	2	3	0	228
% of Tot.	86%	100%	71%	51%	65%	92%	53%	19%	20%	18%	0%	57%
# manned sims	12	12	15	13	19	24	13	0	0	3	0	111
time to comp	283	249	373	389	389	2034	1512	0	0	248	0	5477
time to send	324	1519	373	389	1869	2780	2487	0	0	249	0	9990
Avg.time Comp.	24	21	25	30	20	85	116			83		49
Avg.time send	27	127	25	30	98	116	191			83		90
# Sent Up	1	0	3	10	13	0	33	0	0	2	0	62
% Sent Up	5%	0%	14%	17%	16%	0%	26%	0%	0%	12%	0%	15%
Avg. Delay	233		120	225	102		121			77		730
# Sent Down	0	0	0	5	5	1	3	8	3	1	0	26
% Sent Down	0%	0%	0%	8%	6%	4%	2%	38%	30%	6%	0%	6%

	Adjust Fire	Ammo Status	CFF	Contact Rept	Shell Rept	SitRep	Spot Rept	Intel Rept	Frago	NBC Rept	Route	TOTAL
Summary for Exercise CV_0426_a_o_13												
TOTAL	4	0	9	41	49	14	47	11	11	4	24	214
% of Tot.	2%	0%	4%	19%	23%	7%	22%	5%	5%	2%	11%	
# orig rpts	2	0	4	16	35	11	32	4	3	2	0	109
% of Tot.	50%		44%	39%	71%	79%	68%	36%	27%	50%	0%	51%
# manned sims	3	0	5	10	11	10	6	0	2	2	0	49
time to comp	100		92	324	225	561	456		100	201		2059
time to send	100		93	324	277	562	588		100	201		2245
Avg.time Comp.	33		18	32	20	56	76		50	101		42
Avg.time send	33		19	32	25	56	98		50	101		46
# Sent Up	1	0	2	13	11	2	8	0	0	1	0	38
% Sent Up	50%	0%	50%	81%	31%	18%	25%	0%	0%	50%	0%	35%
Avg. Delay	0.73		2.59	1.79	1.35	1.44	1.99			0.67		0.65
# Sent Down	0	0	1	0	0	0	0	4	2	2	0	9
% Sent Down	0%	0%	25%	0%	0%	0%	0%	100%	67%	100%	0%	8%
Summary for Exercise CV_0503_A_O_14												
TOTAL	18	3	20	83	90	12	183	23	12	5	9	458
% of Tot.	4%	1%	4%	18%	20%	3%	40%	5%	3%	1%	2%	
# orig rpts	14	3	9	33	64	12	118	5	2	1	0	261
% of Tot.	78%	100%	45%	40%	71%	100%	64%	22%	17%	20%	0%	57%
# manned sims	16	3	7	14	24	12	2	0	0	1	0	79
time to comp	180	16	109	886	553	782	156	0	0	60	0	2742
time to send	465	16	109	1517	553	799	156	0	0	60	0	3675
Avg. time comp	11	5	16	63	23	65	78			60		35
Avg. time send	29	5	16	108	23	67	78			60		47
# Sent Up	4	0	6	21	42	0	39	0	0	1	0	113
% Sent Up	22%	0%	30%	25%	47%	0%	21%	0%	0%	20%	0%	25%
Avg. Delay	101	0	74	188	239	0	216	0	0	31	0	849
# Sent Down	0	0	0	2	0	0	1	7	3	1	0	14
% Sent Down	0%	0%	0%	2%	0%	0%	1%	30%	25%	20%	0%	3%

	Adjust Fire	Ammo Status	CFF	Contact Rept	Shell Rept	SitRep	Spot Rept	Intel Rept	Frago	NBC Rept	Route	TOTAL
Summary of Exercise CV_0511_A_O_15												
TOTAL	8	2	7	46	67	31	93	18	8	10	8	298
% of Tot.	3%	1%	2%	15%	22%	10%	31%	6%	3%	3%	3%	0%
# orig rpts	4	2	4	24	50	26	66	6	2	1	0	185
% of Tot.	50%	100%	57%	52%	75%	84%	71%	33%	25%	8%	0%	62%
# manned sims	2	2	3	1	22	26	7	2	1	1	0	67
time to comp	65	13	70	123	549	1876	304	162	58	108	0	3328
time to send	65	13	70	123	565	2007	305	162	58	108	0	3476
Avg.time Comp.	33	7	23	123	25	72	43	81	58	108		50
Avg.time send	33	7	23	123	26	77	44	81	58	108		52
# Sent Up	2	0	1	8	12	3	13	0	0	1	0	40
% Sent Up	25%	0%	14%	17%	18%	10%	14%	0%	0%	8%	0%	13%
Avg. Delay	61	0	229	373	129	130	280	0	0	38	0	1240
# Sent Down	0	1	0	3	11	6	9	6	3	1	0	40
% Sent Down	0%	50%	0%	7%	16%	19%	10%	33%	38%	8%	0%	13%
SUMMARY FOR OFFENSIVE SCENARIOS												
TOTAL	62	20	60	295	326	95	606	87	54	43	65	1713
% of Tot.	4%	1%	4%	17%	19%	6%	35%	5%	3%	3%	4%	
# orig rpts	47	20	35	136	232	84	400	23	12	8	0	997
% of Tot.	76%	100%	58%	46%	71%	88%	66%	26%	22%	19%	0%	58%
# manned sims	40	21	33	47	83	88	36	2	3	8	0	361
time to comp	994	303	693	2037	1833	6185	2849	162	158	709		15923
time to send	4048	1590	706	2737	3426	7155	4023	162	158	716		24721
Avg. time comp	25	14	21	43	22	70	79	81	53	89		44
Avg. time send	101	76	21	58	41	81	112	81	53	90		68
# Sent Up	9	0	12	59	88	6	107	2	0	6	0	289
% Sent Up	15%	0%	20%	20%	27%	6%	18%	2%	0%	14%	0%	17%
Avg. Delay	100		87	167	153	75	151	70		37		697
# Sent Down	0	1	1	13	16	7	14	31	16	6	0	105
% Sent Down	0%	5%	2%	4%	5%	7%	2%	36%	30%	14%	0%	6%

APPENDIX D

Raw Data for Message Traffic Needlines on the Platoon Net

In the accompanying tables, who sent messages to whom is tabulated for each experiment. The experiment number will end in A_O_nn, where nn ranges from 10 to 15, for exercises using the offensive scenario, and will end in A_D_nn for exercises using the defensive scenario. The recipient of the message is listed across the top and the sender of the message is listed along the left side. The first five columns show message traffic for Platoon A, the seond five columns show message traffic for Platoon B, and the last five columns show message traffic for Platoon C. The cells tabulate the number of messages exchanged between each sender-receiver pair for each phase of each experiment.

Exercise CV_0405_a_o_10 Phase 1

A						B					C				
	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT
Platoon Leader					0		2		8	10		2		7	9
Platoon Sgt.	2				2	7				7	2				2
Platoon Wings	7				7	5				5	9				9
Co Cmdr					0					0					0
TOTAL REC'V'D	9	0	0	0	9	12	2	0	8	22	11	2	0	7	20

Exercise CV_0405_a_o_10 Phase 2

A						B					C				
	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT
Platoon Leader				1	1		2		7	9		2		3	5
Platoon Sgt.	1				1	6				6	1				1
Platoon Wings	6				6	7				7					0
Co Cmdr	1				1					0					0
TOTAL REC'V'D	8	0	0	1	9	13	2	0	7	22	1	2	0	3	6

Exercise CV_0405_a_o_10 Phase 3

A						B					C				
	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT
Platoon Leader				2	2		5		1	6		2		8	10
Platoon Sgt.	28				28	11				11					0
Platoon Wings	36				36	5				5					0
Co Cmdr	2				2					0					0
TOTAL REC'V'D	66	0	0	2	68	16	5	0	1	22	0	2	0	8	10

Summary for Exercise CV_0405_a_o_10

A						B					C				
	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT
Platoon Leader				3	3		9			9		6		18	24
Platoon Sgt.	31				31	24				24	3				3
Platoon Wings	49				49	17	0			17	9				9
Co Cmdr	3				3	0	0			0					0
TOTAL REC'V'D	83	0	0	3	86	41	9	0	0	50	12	6	0	18	36

Exercise CV_0406_a_o_10 Phase 1

A							B						C				
	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT
Platoon Leader				11	11		2		8	10			2	6	8
Platoon Sgt.	17				17	4				4	16				16
Platoon Wings	30				30	8				8	26				26
Co Cmdr	1				1					0					0
TOTAL REC'V'D	48	0	0	11	59	12	2	0	8	22	42	2	0	6	50

Exercise CV_0406_a_o_10 Phase 2

A							B						C				
	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT	Leader	Sgt.	Platoon	Co Cmdr.	TOTAL SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT
Platoon Leader				2	2		3		3	6				5	5
Platoon Sgt.	6				6	3				3	4				4
Platoon Wings	8				8	7	1			8	18				18
Co Cmdr	1				1					0					0
TOTAL REC'V'D	15	0	0	2	17	10	4	0	3	17	22	0	0	5	27

Exercise CV_0406_a_o_10 Phase 3

A							B						C				
	Leader	Sgt.	Wings	Co Cmdr.	TOTAL REC'VD	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT
Platoon Leader					0		2		6	8			2	4	6
Platoon Sgt.	23				23	4				4	5				5
Platoon Wings					0					0	13				13
Co Cmdr	1				1					0					0
TOTAL REC'V'D	24	0	0	0	24	4	2	0	6	12	18	2	0	4	24

Summary for Exercise CV_0406_a_o_10

A							B						C				
	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT
Platoon Leader				13	13		7			7			4	15	19
Platoon Sgt.	46				46	11				11	25				25
Platoon Wings	38				38	15				15	57				57
Co Cmdr	3				3					0	0				0
TOTAL REC'V'D	87	0	0	13	100	26	7	0	0	33	82	4	0	15	101

Exercise CV_0420_a_o_12 Phase 1

A	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT	B	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT	C	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT
Platoon Leader				24	24				3	11	14				3	11	14
Platoon Sgt.	18				18		7				7		9				9
Platoon Wings	19				19		8				8		13				13
Co Cmdr					0						0						0
TOTAL RECV'D	37	0	0	24	61		15	3	0	11	29		22	3	0	11	36

Exercise CV_0420_a_o_12 Phase 2

A	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT	B	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT	C	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT
Platoon Leader		2		8	10			2			2			3		7	10
Platoon Sgt.	7				7		9				9		1				1
Platoon Wings	2				2		16	1			17		3				3
Co Cmdr	1				1						0						0
TOTAL RECV'D	10	2	0	8	20		25	3	0	0	28		4	3	0	7	14

Exercise CV_0420_a_o_12 Phase 3

A	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT	B	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT	C	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT
Platoon Leader		2		17	19			3			3			1		12	13
Platoon Sgt.	5				5		4				4		3				3
Platoon Wings	14				14		5	3			8		10				10
Co Cmdr	1				1						0						0
TOTAL RECV'D	20	2	0	17	39		9	6	0	0	15		13	1	0	12	26

Summary for Exercise CV_0420_a_o_12

A	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT	B	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT	C	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT
Platoon Leader		4		49	53			8		11	19			7		30	37
Platoon Sgt.	30				30		20				20		13				13
Platoon Wings	35				35		29	4			33		26				26
Co Cmdr	2				2		0	0			0						0
TOTAL RECV'D	67	4	0	49	120		49	12	0	11	72		39	7	0	30	76

Exercise CV_0419_A_O_12 Phase 1

A	Leader	Sgt.	Wings	Co Cmdr.	TOTAL B SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL C SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT
Platoon Leader				24	24		2		11	13		3		11	14
Platoon Sgt.	18				18	12				12	9				9
Platoon Wings	19				19	11				11	13				13
Co Cmdr					0					0					0
TOTAL RECVD	37	0	0	24	61	23	2	0	11	36	22	3	0	11	36

Exercise CV_0419_A_O_12 Phase 2

A	Leader	Sgt.	Wings	Co Cmdr.	TOTAL B SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL C SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT
Platoon Leader		2		8	10		3		3	6		3		7	10
Platoon Sgt.	7				7	3				3	1				1
Platoon Wings	2				2	2				2	3				3
Co Cmdr	1				1					0					0
TOTAL RECVD	10	2	0	8	20	5	3	0	3	11	4	3	0	7	14

Exercise CV_0419_A_O_12 Phase 3

A	Leader	Sgt.	Wings	Co Cmdr.	TOTAL B SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL C SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT
Platoon Leader		2		17	19		1		1	2		1		12	13
Platoon Sgt.	5				5	5				5	3				3
Platoon Wings	14				14	8				8	10				10
Co Cmdr	1				1					0					0
TOTAL RECVD	20	2	0	17	39	13	1	0	1	15	13	1	0	12	26

Summary for Exercise CV_0419_A_O_12

A	Leader	Sgt.	Wings	Co Cmdr.	TOTAL B SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL C SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT
Platoon Leader		4		49	53		6		15	21		7		30	37
Platoon Sgt.	30				30	20				20	13				13
Platoon Wings	35				35	21				21	26				26
Co Cmdr	2				2					0					0
TOTAL RECVD	67	4	0	49	120	41	6	0	15	62	39	7	0	30	76

Exercise CV_0427_A_D_13 Phase 1

A	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT	B Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT	C Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT
Platoon Leader				13	13		6		5	11		1		3	4
Platoon Sgt.	2				2	1				1	2				2
Platoon Wings	8				8	5	1			6	10				10
Co Cmdr	1				1					0					0
TOTAL RECV'D	11	0	0	13	24	6	7	0	5	18	12	1	0	3	16

Exercise CV_0427_A_D_13 Phase 2

A	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT	B Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT	C Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT
Platoon Leader				12	12		2		2	4				3	3
Platoon Sgt.	4				4					0	5				5
Platoon Wings	12				12	3				3	22				22
Co Cmdr	1				1					0					0
TOTAL RECV'D	17	0	0	12	29	3	2	0	2	7	27	0	0	3	30

Exercise CV_0427_A_D_13 Phase 3

A	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT	B Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT	C Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT
Platoon Leader				10	10		3		3	6				6	6
Platoon Sgt.	5				5	4				4	3				3
Platoon Wings	5				5	3				3	3				3
Co Cmdr	1				1					0					0
TOTAL RECV'D	11	0	0	10	21	7	3	0	3	13	6	0	0	6	12

Summary for Exercise CV_0427_A_D_13

A	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT	B Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT	C Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT
Platoon Leader				35	35		11		10	21		1		12	13
Platoon Sgt.	11				11	5				5	10				10
Platoon Wings	25				25	11	1			12	35				35
Co Cmdr	3				3					0					0
TOTAL RECV'D	39	0	0	35	74	16	12	0	10	38	45	1	0	12	58

Exercise CV_0426_A_O_13 Phase 1

A	Leader	Sgt.	Wings	Co Cmdr.	TOTAL B SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL C SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT
Platoon Leader				15	15		1		4	5				4	4
Platoon Sgt.	2				2	4				4	4				4
Platoon Wings	9				9					0	12				12
Co Cmdr					0					0					0
TOTAL REC'V'D	11	0	0	15	26	4	1	0	4	9	16	0	0	4	20

Exercise CV_0426_A_O_13 Phase 2

A	Leader	Sgt.	Wings	Co Cmdr.	TOTAL B SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL C SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT
Platoon Leader		2		7	9		2		7	9		1		2	3
Platoon Sgt.					0	3				3	2				2
Platoon Wings	6				6	2				2	9				9
Co Cmdr	1				1					0					0
TOTAL REC'V'D	7	2	0	7	16	5	2	0	7	14	11	1	0	2	14

Exercise CV_0426_A_O_13 Phase 3

A	Leader	Sgt.	Wings	Co Cmdr.	TOTAL B SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL C SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT
Platoon Leader		1		8	9		3		3	6					0
Platoon Sgt.					0	3				3	2				2
Platoon Wings	6				6					0	4				4
Co Cmdr	2				2					0					0
TOTAL REC'V'D	8	1	0	8	17	3	3	0	3	9	6	0	0	0	6

Summary for Exercise CV_0426_A_O_13

A	Leader	Sgt.	Wings	Co Cmdr.	TOTAL B SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL C SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT
Platoon Leader		3	0	30	33		6		14	20		1	0	6	7
Platoon Sgt.	2		0	0	2	10				10	8		0	0	8
Platoon Wings	21	0		0	21	2	0			2	25	0		0	25
Co Cmdr	3	0	0		3					0	0	0	0		0
TOTAL REC'V'D	26	3	0	30	59	12	6	0	14	32	33	1	0	6	40

Exercise CV_0502_A_D_14 Phase 1

A	Leader	Sgt.	Wings	Co Cmdr.	TOTAL B SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL C SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT
Platoon Leader		2		19	21		9		20	29		3		6	9
Platoon Sgt.	12				12	23				23	2				2
Platoon Wings	6				6	19	1			20	11				11
Co Cmdr					0					0					0
TOTAL RECVD	18	2	0	19	39	42	10	0	20	72	13	3	0	6	22

Exercise CV_0502_A_D_14 Phase 2

A	Leader	Sgt.	Wings	Co Cmdr.	TOTAL B SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL C SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT
Platoon Leader		2		14	16		3		7	10		2		3	5
Platoon Sgt.	12				12	13				13	11				11
Platoon Wings	19				19	12	1			13	21				21
Co Cmdr	1				1					0					0
TOTAL RECVD	32	2	0	14	48	25	4	0	7	36	32	2	0	3	37

Exercise CV_0502_A_D_14 Phase 3

A	Leader	Sgt.	Wings	Co Cmdr.	TOTAL B SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL C SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT
Platoon Leader		2		10	12		2		8	10		1		2	3
Platoon Sgt.	4				4	8				8	5				5
Platoon Wings	2				2	15				15	2				2
Co Cmdr	1				1					0					0
TOTAL RECVD	7	2	0	10	19	23	2	0	8	33	7	1	0	2	10

Summary for Exercise CV_0502_A_D_14

A	Leader	Sgt.	Wings	Co Cmdr.	TOTAL B SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL C SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT
Platoon Leader		6		43	49		14		35	49		6		11	17
Platoon Sgt.	28				28	44				44	18				18
Platoon Wings	27				27	46	2			48	34				34
Co Cmdr	2				2					0					0
TOTAL RECVD	57	6	0	43	106	90	16	0	35	141	52	6	0	11	69

Exercise CV_0503_A_O_14 Phase 1

A	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT	B Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT	C Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT
Platoon Leader		1		38	39		1		15	16		1		17	18
Platoon Sgt.	30				30	13				13	18				18
Platoon Wings	29				29	9				9	43				43
Co Cmdr					0					0					0
TOTAL RECV'D	59	1	0	38	98	22	1	0	15	38	61	1	0	17	79

Exercise CV_0503_A_O_14 Phase 2

A	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT	B Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT	C Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT
Platoon Leader		3		5	8		3		4	7		2		5	7
Platoon Sgt.	3				3	7				7	3				3
Platoon Wings	18				18	2				2	10				10
Co Cmdr	1				1					0					0
TOTAL RECV'D	22	3	0	5	30	9	3	0	4	16	13	2	0	5	20

Exercise CV_0503_A_O_14 Phase 3

A	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT	B Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT	C Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT
Platoon Leader		2		6	8		4		11	15					0
Platoon Sgt.	3				3	13				13	5	2		5	12
Platoon Wings	5				5	8				8	4				4
Co Cmdr	1				1					0					0
TOTAL RECV'D	9	2	0	6	17	21	4	0	11	36	9	2	0	5	16

Summary for Exercise CV_0503_A_O_14

A	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT	B Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT	C Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT
Platoon Leader		6		49	55		8		30	38		3		22	25
Platoon Sgt.	36				36	33				33	26			5	31
Platoon Wings	52				52	19	0			19	57				57
Co Cmdr	2				2					0					0
TOTAL RECV'D	90	6	0	49	145	52	8	0	30	90	83	3	0	27	113

Exercise CV_0510_A_D_15 Phase 1

A	Leader	Sgt.	Wings	Co Cmdr.	TOTAL B SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL C SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT
Platoon Leader		3		10	13		6		5	11				5	5
Platoon Sgt.	3				3	8				8	6				6
Platoon Wings	8				8	4	1			5	3				3
Co Cmdr	1				1					0					0
TOTAL RECVD	12	3	0	10	25	12	7	0	5	24	9	0	0	5	14

Exercise CV_0510_A_D_15 Phase 2

A	Leader	Sgt.	Wings	Co Cmdr.	TOTAL B SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL C SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT
Platoon Leader		2		8	10		3		3	6					0
Platoon Sgt.	13				13	6				6	13				13
Platoon Wings	31				31	7	1			8	15				15
Co Cmdr	2				2					0					0
TOTAL RECVD	46	2	0	8	56	13	4	0	3	20	28	0	0	0	28

Exercise CV_0510_A_D_15 Phase 3

A	Leader	Sgt.	Wings	Co Cmdr.	TOTAL B SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL C SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT
Platoon Leader		6		9	15		6		2	8		1		5	6
Platoon Sgt.	3				3	10				10					0
Platoon Wings	2				2	13	1			14	7				7
Co Cmdr	4				4					0					0
TOTAL RECVD	9	6	0	9	24	23	7	0	2	32	7	1	0	5	13

Summary for Exercise CV_0510_A_D_15

A	Leader	Sgt.	Wings	Co Cmdr.	TOTAL B SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL C SENT	Leader	Sgt.	Wings	Co Cmdr.	TOTAL SENT
Platoon Leader		11		27	38		15		10	25		1		10	11
Platoon Sgt.	19				19	24				24	19				19
Platoon Wings	41				41	24	3			27	25				25
Co Cmdr	7				7					0					0
TOTAL RECVD	67	11	0	27	105	48	18	0	10	76	44	1	0	10	55

Exercise CV_0511_A_O_15 Phase 1

A						TOTAL	B				TOTAL	C				TOTAL
	Leader	Sgt.	Wings	Co Cmdr.	SENT	Leader	Sgt.	Wings	Co Cmdr.	SENT	Leader	Sgt.	Wings	Co Cmdr.	SENT
Platoon Leader		4		17	21		2		6	8				3	3
Platoon Sgt.	5				5	7				7	14				14
Platoon Wings	12				12	11				11	5				5
Co Cmdr					0					0					0
TOTAL REC'V'D	17	4	0	17	38	18	2	0	6	26	19	0	0	3	22

Exercise CV_0511_A_O_15 Phase 2

A						TOTAL	B				TOTAL	C				TOTAL
	Leader	Sgt.	Wings	Co Cmdr.	SENT	Leader	Sgt.	Wings	Co Cmdr.	SENT	Leader	Sgt.	Wings	Co Cmdr.	SENT
Platoon Leader		2		9	11		2		5	7					0
Platoon Sgt.	1				1	3				3	2				2
Platoon Wings	6				6	5				5	7				7
Co Cmdr	1				1					0					0
TOTAL REC'V'D	8	2	0	9	19	8	2	0	5	15	9	0	0	0	9

Exercise CV_0511_A_O_15 Phase 3

A						TOTAL	B				TOTAL	C				TOTAL
	Leader	Sgt.	Wings	Co Cmdr.	SENT	Leader	Sgt.	Wings	Co Cmdr.	SENT	Leader	Sgt.	Wings	Co Cmdr.	SENT
Platoon Leader		2		12	14		2		6	8				1	1
Platoon Sgt.	11				11	6				6	8				8
Platoon Wings	24				24	8				8	16				16
Co Cmdr	1				1					0					0
TOTAL REC'V'D	36	2	0	12	50	14	2	0	6	22	24	0	0	1	25

Summary for Exercise CV_0511_A_O_15

A						TOTAL	B				TOTAL	C				TOTAL
	Leader	Sgt.	Wings	Co Cmdr.	SENT	Leader	Sgt.	Wings	Co Cmdr.	SENT	Leader	Sgt.	Wings	Co Cmdr.	SENT
Platoon Leader		8		38	46		6		17	23				4	4
Platoon Sgt.	17				17	16				16	24				24
Platoon Wings	42				42	24	0			24	28				28
Co Cmdr	2				2					0					0
TOTAL REC'V'D	61	8	0	38	107	40	6	0	17	63	52	0	0	4	56

APPENDIX E

Summaries of Communications Needlines on the Platoon Nets

In the accompanying tables, who sent messages to whom is tabulated for each experiment. The experiment number will end in A_O_nn, where nn ranges from 10 to 15, for exercises using the offensive scenario, and will end in A_D_nn for exercises using the defensive scenario. The recipient of the message is listed across the top and the sender of the message is listed along the left side. The data are summed across all three platoons. The cells tabulate the number of messages exchanged between each sender-receiver pair for all phases of each experiment. Some simple computations of the percentages of messages sent and received are included in the last few columns of the table. % TOTAL is the percentage of all the messages on that net that a given individual was involved in (i.e. as either a sender or reccipient). The next two columns simply indicate the percentage, of those messages an individual was involved in, that were received or were sent.

SUMMARIES FOR DEFENSIVE EXERCISES

Summary for Exercise CV_0405_A_D_10

RECEIVER / SENDER	Leader	Sgt.	Wings	TOTAL SENT	TOTAL S & R	% TOTAL	% Rec'd	% Sent
Platoon Leader		15		15	148	100%	90%	10%
Platoon Sgt.	58			58	73	49%	21%	79%
Platoon Wings	75			75	75	51%	0%	100%
TOTAL REC'V'D	133	15	0	148				

Summary for Exercise CV_0420_A_D_12

RECEIVER / SENDER	Leader	Sgt.	Wings	TOTAL SENT	TOTAL S & R	% TOTAL	% Rec'd	% Sent
Platoon Leader		19		19	172	98%	89%	11%
Platoon Sgt.	63			63	86	49%	27%	73%
Platoon Wings	90	4		94	94	53%	0%	100%
TOTAL REC'V'D	153	23	0	176				

Summary for Exercise CV_0427_A_D_13

RECEIVER / SENDER	Leader	Sgt.	Wings	TOTAL SENT	TOTAL S & R	% TOTAL	% Rec'd	% Sent
Platoon Leader		1		1	32	100%	97%	3%
Platoon Sgt.	10			10	11	34%	9%	91%
Platoon Wings	21			21	21	66%	0%	100%
TOTAL REC'V'D	31	1	0	32				

Summary for Exercise CV_0502_A_D_14

SENDER \ RECEIVER	Leader	Sgt.	Wings	TOTAL SENT	TOTAL S & R	% TOTAL	% Rec'd	% Sent
Platoon Leader		26		26	223	99%	88%	12%
Platoon Sgt.	90			90	118	52%	24%	76%
Platoon Wings	107	2		109	109	48%	0%	100%
TOTAL REC'V'D	197	28	0	225				

Summary for Exercise CV_0510_A_D_15

SENDER \ RECEIVER	Leader	Sgt.	Wings	TOTAL SENT	TOTAL S & R	% TOTAL	% Rec'd	% Sent
Platoon Leader		27		27	179	98%	85%	15%
Platoon Sgt.	62			62	92	51%	33%	67%
Platoon Wings	90	3		93	93	51%	0%	100%
TOTAL REC'V'D	152	30	0	182				

Summary for All Defensive Exercises

SENDER \ RECEIVER	Leader	Sgt.	Wings	TOTAL SENT	TOTAL S & R	% TOTAL	% Rec'd	% Sent	Avg Sent
Platoon Leader		88		88	754	99%	88%	12%	18
Platoon Sgt.	283			283	380	50%	26%	74%	57
Platoon Wings	383	9		392	392	51%	0%	100%	78
TOTAL REC'V'D	666	97	0	763					

SUMMARIES FOR OFFENSIVE EXERCISES

Summary for Exercise CV_0406_a_o_10

SENDER \ RECEIVER	Platoon Leader	Platoon Sgt.	Platoon Wings	TOTAL SENT	TOTAL S & R	% TOTAL	% Rec'd	% Sent
Platoon Leader		11		11	203	100%	95%	5%
Platoon Sgt.	82			82	93	46%	12%	88%
Platoon Wings	110			110	110	54%	0%	100%
TOTAL REC'V'D	192	11	0	203				

Summary for Exercise CV_0419_A_O_12

SENDER \ RECEIVER	Platoon Leader	Platoon Sgt.	Platoon Wings	TOTAL SENT	TOTAL S & R	% TOTAL	% Rec'd	% Sent
Platoon Leader		17		17	162	100%	90%	10%
Platoon Sgt.	63			63	80	49%	21%	79%
Platoon Wings	82			82	82	51%	0%	100%
TOTAL REC'V'D	145	17	0	162				

Summary for Exercise CV_0426_A_O_13

SENDER \ RECEIVER	Platoon Leader	Platoon Sgt.	Platoon Wings	TOTAL SENT	TOTAL S & R	% TOTAL	% Rec'd	% Sent
Platoon Leader		10		10	78	100%	87%	13%
Platoon Sgt.	20			20	30	38%	33%	67%
Platoon Wings	48			48	48	62%	0%	100%
TOTAL REC'V'D	68	10	0	78				

Summary for Exercise CV_0503_A_O_14

SENDER \ RECEIVER	Platoon Leader	Platoon Sgt.	Platoon Wings	TOTAL SENT	TOTAL S & R	% TOTAL	% Rec'd	% Sent
Platoon Leader		17		17	240	100%	93%	7%
Platoon Sgt.	95			95	112	47%	15%	85%
Platoon Wings	128			128	128	53%	0%	100%
TOTAL REC'V'D	223	17	0	240				

Summary for Exercise CV_0511_A_O_15

SENDER \ RECEIVER	Platoon Leader	Platoon Sgt.	Platoon Wings	TOTAL SENT	TOTAL S & R	% TOTAL	% Rec'd	% Sent
Platoon Leader		14		14	165	100%	92%	8%
Platoon Sgt.	57			57	71	43%	20%	80%
Platoon Wings	94			94	94	57%	0%	100%
TOTAL REC'V'D	151	14	0	165				

Summary for All Offensive Exercises

SENDER \ RECEIVER	Platoon Leader	Platoon Sgt.	Platoon Wings	TOTAL SENT	TOTAL S & R	% TOTAL	% Rec'd	% Sent	Avg Sent
Platoon Leader		69		69	848	100%	92%	8%	14
Platoon Sgt.	317			317	386	46%	18%	82%	63
Platoon Wings	462			462	462	54%	0%	100%	92
TOTAL REC'V'D	779	69	0	848					

APPENDIX F

Raw data for Message Traffic Needlines on the Company Command Net

In the accompanying tables, who sent messages to whom is tabulated for each experiment. The experiment number will end in A_O_nn, where nn ranges from 10 to 15, for exercises using the offensive scenario, and will end in A_D_nn for exercises using the defensive scenario. The recipient of the message is listed across the top and the sender of the message is listed along the left side. The cells tabulate the number of messages exchanged between each sender-receiver pair for each phase of each experiment.

Exercise CV_0405_A_D_10 Phase 1

Sender	Rec'v'r Co Cmmdr	Co XO	A Plt Ldr	B Plt Ldr	C Plt Ldr	Co 1Sgt	TOTAL SENT
Co Cmdr							0
Co XO							0
A Plt Ldr							0
B Plt Ldr	8						8
C Plt Ldr	7						7
Co 1Sgt							0
TOTAL REC'V'D	15	0	0	0	0	0	15

Exercise CV_0405_A_D_10 Phase 2

Sender	Rec'v'r Co Cmmdr	Co XO	A Plt Ldr	B Plt Ldr	C Plt Ldr	Co 1Sgt	TOTAL SENT
Co Cmdr			1				1
Co XO							0
A Plt Ldr	1						1
B Plt Ldr	7					1	8
C Plt Ldr	3						3
Co 1Sgt							0
TOTAL REC'V'D	11	0	1	0	0	1	13

Exercise CV_0405_A_D_10 Phase 3

Sender	Rec'v'r Co Cmmdr	Co XO	A Plt Ldr	B Plt Ldr	C Plt Ldr	Co 1Sgt	TOTAL SENT
Co Cmdr			2				2
Co XO							0
A Plt Ldr							0
B Plt Ldr	1						1
C Plt Ldr	8					1	9
Co 1Sgt							0
TOTAL REC'V'D	9	0	2	0	0	1	12

Exercise CV_0406_A_O_10 Phase 1

Sender	Rec'v'r Co Cmmdr	Co XO	A Plt Ldr	B Plt Ldr	C Plt Ldr	Co 1Sgt	TOTAL SENT
Co Cmdr			1				1
Co XO							0
A Plt Ldr	11						11
B Plt Ldr	8						8
C Plt Ldr	6						6
Co 1Sgt							0
TOTAL REC'V'D	25	0	1	0	0	0	26

Exercise CV_0406_A_O_10 Phase 2

Sender	Rec'v'r Co Cmmdr	Co XO	A Plt Ldr	B Plt Ldr	C Plt Ldr	Co 1Sgt	TOTAL SENT
Co Cmdr			1				1
Co XO							0
A Plt Ldr	2						2
B Plt Ldr	3						3
C Plt Ldr	5						5
Co 1Sgt							0
TOTAL SENT	10	0	1	0	0	0	11
TOTAL REC'V'D							

Exercise CV_0406_A_O_10 Phase 3.

Sender	Rec'v'r Co Cmmdr	Co XO	A Plt Ldr	B Plt Ldr	C Plt Ldr	Co 1Sgt	TOTAL SENT
Co Cmdr			1				1
Co XO							0
A Plt Ldr							0
B Plt Ldr	6						6
C Plt Ldr	4						4
Co 1Sgt							0
TOTAL REC'V'D	10	0	1	0	0	0	11

Exercise CV_0419_A_O_12 Phase 1

Sender	Rec'v'r Co Cmmdr	Co XO	A Plt Ldr	B Plt Ldr	C Plt Ldr	Co 1Sgt	TOTAL SENT
Co Cmdr							0
Co XO							
A Plt Ldr	24					1	25
B Plt Ldr	11					1	12
C Plt Ldr	11					1	12
Co 1Sgt							0
TOTAL REC'V'D	46	0	0	0	0	3	49

Exercise CV_0419_A_O_12 Phase 2

Sender	Rec'v'r Co Cmmdr	Co XO	A Plt Ldr	B Plt Ldr	C Plt Ldr	Co 1Sgt	TOTAL SENT
Co Cmdr			1				1
Co XO							
A Plt Ldr	8						8
B Plt Ldr	3						3
C Plt Ldr	7						7
Co 1Sgt							0
TOTAL REC'V'D	18	0	1	0	0	0	19

Exercise CV_0419_A_O_12 Phase 3

Sender	Rec'v'r Co Cmmdr	Co XO	A Plt Ldr	B Plt Ldr	C Plt Ldr	Co 1Sgt	TOTAL SENT
Co Cmdr			1				1
Co XO							0
A Plt Ldr	17					1	18
B Plt Ldr	1						1
C Plt Ldr	12					1	13
Co 1Sgt							0
TOTAL REC'V'D	30	0	1	0	0	2	33

Exercise CV_0420_A_D_12 Phase 1

Sender	Rec'v'r Co Cmmdr	Co XO	A Plt Ldr	B Plt Ldr	C Plt Ldr	Co 1Sgt	TOTAL SENT
Co Cmdr			1				1
Co XO							0
A Plt Ldr	20						20
B Plt Ldr	10						10
C Plt Ldr	10						10
Co 1Sgt							0
TOTAL REC'V'D	40	0	1	0	0	0	41

Exercise CV_0420_A_D_12 Phase 2

Sender \ Rec'v'r	Co Cmmdr	Co XO	A Plt Ldr	B Plt Ldr	C Plt Ldr	Co 1Sgt	TOTAL SENT
Co Cmdr			1				1
Co XO							0
A Plt Ldr	11						11
B Plt Ldr	9						9
C Plt Ldr	9						9
Co 1Sgt							0
TOTAL REC'V'D	29	0	1	0	0	0	30

Exercise CV_0420_A_D_12 Phase 3

Sender \ Rec'v'r	Co Cmmdr	Co XO	A Plt Ldr	B Plt Ldr	C Plt Ldr	Co 1Sgt	TOTAL SENT
Co Cmdr			1				1
Co XO							0
A Plt Ldr	16						16
B Plt Ldr	4					1	5
C Plt Ldr	13						13
Co 1Sgt							0
TOTAL REC'V'D	33	0	1	0	0	1	35

Exercise CV_0426_A_O_13 Phase 1

Sender \ Rec'v'r	Co Cmmdr	Co XO	A Plt Ldr	B Plt Ldr	C Plt Ldr	Co 1Sgt	TOTAL SENT
Co Cmdr							0
Co XO							0
A Plt Ldr	15						15
B Plt Ldr	4						4
C Plt Ldr	4						4
Co 1Sgt							0
TOTAL REC'V'D	23	0	0	0	0	0	23

Exercise CV_0426_A_O_13 Phase 2

Sender \ Rec'v'r	Co Cmmdr	Co XO	A Plt Ldr	B Plt Ldr	C Plt Ldr	Co 1Sgt	TOTAL SENT
Co Cmdr			1				1
Co XO							0
A Plt Ldr	7						7
B Plt Ldr	7						7
C Plt Ldr	2						2
Co 1Sgt							0
TOTAL REC'V'D	16	0	1	0	0	0	17

Exercise CV_0426_A_O_13 Phase 3

Sender \ Rec'v'r	Co Cmmdr	Co XO	A Plt Ldr	B Plt Ldr	C Plt Ldr	Co 1Sgt	TOTAL SENT
Co Cmdr			2				2
Co XO							0
A Plt Ldr	8						8
B Plt Ldr	3						3
C Plt Ldr							0
Co 1Sgt							0
TOTAL REC'V'D	11	0	2	0	0	0	13

Exercise CV_0427_A_D_13 Phase 1

Sender \ Rec'v'r	Co Cmmdr	Co XO	A Plt Ldr	B Plt Ldr	C Plt Ldr	Co 1Sgt	TOTAL SENT
Co Cmdr			1				1
Co XO							0
A Plt Ldr	13						13
B Plt Ldr	5						5
C Plt Ldr	3						3
Co 1Sgt							0
TOTAL REC'V'D	21	0	1	0	0	0	22

Exercise CV_0427_A_D_13 Phase 2

Sender \ Rec'v'r	Co Cmmdr	Co XO	A Plt Ldr	B Plt Ldr	C Plt Ldr	Co 1Sgt	TOTAL SENT
Co Cmdr			1				1
Co XO							0
A Plt Ldr	12						12
B Plt Ldr	2						2
C Plt Ldr	3						3
Co 1Sgt							0
TOTAL REC'V'D	17	0	1	0	0	0	18

Exercise CV_0427_A_D_13 Phase 3

Sender \ Rec'v'r	Co Cmmdr	Co XO	A Plt Ldr	B Plt Ldr	C Plt Ldr	Co 1Sgt	TOTAL SENT
Co Cmdr			1				1
Co XO							0
A Plt Ldr	10						10
B Plt Ldr	3						3
C Plt Ldr	1						1
Co 1Sgt							0
TOTAL REC'V'D	14	0	1	0	0	0	15

Exercise CV_0502_A_D_14 Phase 1

Sender \ Rec'v'r	Co Cmmdr	Co XO	A Plt Ldr	B Plt Ldr	C Plt Ldr	Co 1Sgt	TOTAL SENT
Co Cmdr							0
Co XO							0
A Plt Ldr	19						19
B Plt Ldr	20						20
C Plt Ldr	6					1	7
Co 1Sgt							0
TOTAL REC'V'D	45	0	0	0	0	1	46

Exercise CV_0502_A_D_14 Phase 2

Sender \ Rec'v'r	Co Cmmdr	Co XO	A Plt Ldr	B Plt Ldr	C Plt Ldr	Co 1Sgt	TOTAL SENT
Co Cmdr			1				1
Co XO							0
A Plt Ldr	14						14
B Plt Ldr	7						7
C Plt Ldr	3						3
Co 1Sgt							0
TOTAL REC'V'D	24	0	1	0	0	0	25

Exercise CV_0502_A_D_14 Phase 3

Sender \ Rec'v'r	Co Cmmdr	Co XO	A Plt Ldr	B Plt Ldr	C Plt Ldr	Co 1Sgt	TOTAL SENT
Co Cmdr			1				1
Co XO							0
A Plt Ldr	10						10
B Plt Ldr	8					2	10
C Plt Ldr	2					1	3
Co 1Sgt							0
TOTAL REC'V'D	20	0	1	0	0	3	24

Exercise CV_0503_A_O_14 Phase 1

Sender \ Rec'v'r	Co Cmmdr	Co XO	A Plt Ldr	B Plt Ldr	C Plt Ldr	Co 1Sgt	TOTAL SENT
Co Cmdr							0
Co XO							0
A Plt Ldr	38						38
B Plt Ldr	15						15
C Plt Ldr	17				1		18
Co 1Sgt							0
TOTAL REC'V'D	70	0	0	0	1	0	71

Exercise CV_0503_A_O_14 Phase 2

Sender \ Rec'v'r	Co Cmmdr	Co XO	A Plt Ldr	B Plt Ldr	C Plt Ldr	Co 1Sgt	TOTAL SENT
Co Cmdr			1				1
Co XO							0
A Plt Ldr	5						5
B Plt Ldr	4						4
C Plt Ldr	5						5
Co 1Sgt							0
TOTAL REC'V'D	14	0	1	0	0	0	15

Exercise CV_0503_A_O_14 Phase 3

Sender \ Rec'v'r	Co Cmmdr	Co XO	A Plt Ldr	B Plt Ldr	C Plt Ldr	Co 1Sgt	TOTAL SENT
Co Cmdr			1				1
Co XO							0
A Plt Ldr	6					1	7
B Plt Ldr	11						11
C Plt Ldr	5					1	6
Co 1Sgt							0
TOTAL REC'V'D	22		1	0	0	2	25

Exercise CV_0510_A_D_15 Phase 1

Sender \ Rec'v'r	Co Cmmdr	Co XO	A Plt Ldr	B Plt Ldr	C Plt Ldr	Co 1Sgt	TOTAL SENT
Co Cmdr			1				1
Co XO							0
A Plt Ldr	10						10
B Plt Ldr	5						5
C Plt Ldr	5						5
Co 1Sgt							0
TOTAL REC'V'D	20	0	1	0	0	0	21

Exercise CV_0510_A_D_15 Phase 2

Sender \ Rec'v'r	Co Cmmdr	Co XO	A Plt Ldr	B Plt Ldr	C Plt Ldr	Co 1Sgt	TOTAL SENT
Co Cmdr			2				2
Co XO							0
A Plt Ldr	8						8
B Plt Ldr	3						3
C Plt Ldr							0
Co 1Sgt							0
TOTAL REC'V'D	11	0	2	0	0	0	13

Exercise CV_0510_A_D_15 Phase 3

Sender \ Rec'v'r	Co Cmmdr	Co XO	A Plt Ldr	B Plt Ldr	C Plt Ldr	Co 1Sgt	TOTAL SENT
Co Cmdr			4				4
Co XO							0
A Plt Ldr	9						9
B Plt Ldr	2						2
C Plt Ldr	5						5
Co 1Sgt							0
TOTAL REC'V'D	16	0	4	0	0	0	20

Exercise CV_0511_A_D_15 Phase 1

Sender \ Rec'v'r	Co Cmmdr	Co XO	A Plt Ldr	B Plt Ldr	C Plt Ldr	Co 1Sgt	TOTAL SENT
Co Cmdr							0
Co XO							0
A Plt Ldr	17						17
B Plt Ldr	6						6
C Plt Ldr	3						3
Co 1Sgt							0
TOTAL REC'V'D	26	0	0	0	0	0	26

Exercise CV_0511_A_D_15 Phase 2

Sender \ Rec'v'r	Co Cmmdr	Co XO	A Plt Ldr	B Plt Ldr	C Plt Ldr	Co 1Sgt	TOTAL SENT
Co Cmdr			1				1
Co XO							0
A Plt Ldr	9						9
B Plt Ldr	5						5
C Plt Ldr							0
Co 1Sgt							0
TOTAL REC'V'D	14	0	1	0	0	0	15

Exercise CV_0511_A_D_15 Phase 3

Sender \ Rec'v'r	Co Cmmdr	Co XO	A Plt Ldr	B Plt Ldr	C Plt Ldr	Co 1Sgt	TOTAL SENT
Co Cmdr			1				1
Co XO							0
A Plt Ldr	12						12
B Plt Ldr	6						6
C Plt Ldr	1						1
Co 1Sgt							0
TOTAL REC'V'D	19	0	1	0	0	0	20

APPENDIX G

Summaries of Communications Needlines on the Company Command Net

In the accompanying tables, who sent messages to whom is tabulated for each experiment. The experiment number will end in A_O_nn, where nn ranges from 10 to 15, for exercises using the offensive scenario, and will end in A_D_nn for exercises using the defensive scenario. The recipient of the message is listed across the top and the sender of the message is listed along the left side. The cells tabulate the number of messages exchanged between each sender-receiver pair for all phases of each experiment. Some simple computations of the percentages of messages sent and received are included in the last few columns of the table. % TOTAL is the percentage of all the messages on that net that a given individual was involved in (i.e. as either a sender or reccipient). The next two columns simply indicate the percentage, of those messages an individual was involved in, that were received or were sent.

SUMMARIES FOR DEFENSIVE EXERCISES

Summary for Exercise CV_0405_A_D_10

RECEIVER / SENDER	Co Cmmdr	Co XO	A Plt Ldr	B Plt Ldr	C Plt Ldr	Co 1Sgt	TOTAL SENT	TOTAL S & R	% TOTAL	% Rec'd	% Sent
Co Cmdr		0	3	0	0	0	3	38	95%	92%	8%
Co XO	0		0	0	0	0	0	0	0%		
A Plt Ldr	1	0				0	1	4	10%	75%	25%
B Plt Ldr	16	0				1	17	17	43%	0%	100%
C Plt Ldr	18	0				1	19	19	48%	0%	100%
Co 1Sgt	0	0	0	0	0		0	2	5%	100%	0%
TOTAL REC'V'D	35	0	3	0	0	2	40				

Summary for Exercise CV_0420_A_D_12

RECEIVER / SENDER	Co Cmmdr	Co XO	A Plt Ldr	B Plt Ldr	C Plt Ldr	Co 1Sgt	TOTAL SENT	TOTAL S & R	% TOTAL	% Rec'd	% Sent
Co Cmdr		0	3	0	0	0	3	105	99%	97%	3%
Co XO	0		0	0	0	0	0	0	0%		
A Plt Ldr	47	0				0	47	50	47%	6%	94%
B Plt Ldr	23	0				1	24	24	23%	0%	100%
C Plt Ldr	32	0				0	32	32	30%	0%	100%
Co 1Sgt	0	0	0	0	0		0	1	1%	100%	0%
TOTAL REC'V'D	102	0	3	0	0	1	106	212			

Summary for Exercise CV_0427_A_D_13

RECEIVER / SENDER	Co Cmmdr	Co XO	A Plt Ldr	B Plt Ldr	C Plt Ldr	Co 1Sgt	TOTAL SENT	TOTAL S & R	% TOTAL	% Rec'd	% Sent
Co Cmdr		0	3	0	0	0	3	55	100%	95%	5%
Co XO	0		0	0	0	0	0	0	0%		
A Plt Ldr	35	0				0	35	38	69%	8%	92%
B Plt Ldr	10	0				0	10	10	18%	0%	100%
C Plt Ldr	7	0				0	7	7	13%	0%	100%
Co 1Sgt	0	0	0	0	0		0	0	0%		
TOTAL REC'V'D	52	0	3	0	0	0	55	110			

Summary for Exercise CV_0502_A_D_14

SENDER / RECEIVER	Co Cmmdr	Co XO	A Plt Ldr	B Plt Ldr	C Plt Ldr	Co 1Sgt	TOTAL SENT	TOTAL S & R	% TOTAL	% Rec'd	% Sent
Co Cmdr		0	2	0	0	0	2	91	96%	98%	2%
Co XO	0					0	0	0	0%		
A Plt Ldr	43	0				0	43	45	47%	4%	96%
B Plt Ldr	35	0				2	37	37	39%	0%	100%
C Plt Ldr	11	0				2	13	13	14%	0%	100%
Co 1Sgt	0	0	0	0	0		0	4	4%	100%	0%
TOTAL REC'V'D	89	0	2	0	0	4	95	190			

Summary for Exercise CV_0510_A_D_15

SENDER / RECEIVER	Co Cmmdr	Co XO	A Plt Ldr	B Plt Ldr	C Plt Ldr	Co 1Sgt	TOTAL SENT	TOTAL S & R	% TOTAL	% Rec'd	% Sent
Co Cmdr	0	0	7	0	0	0	7	54	100%	87%	13%
Co XO			0	0	0	0	0	0	0%		
A Plt Ldr	27	0					27	34	63%	21%	79%
B Plt Ldr	10	0					10	10	19%	0%	100%
C Plt Ldr	10	0					10	10	19%	0%	100%
Co 1Sgt	0	0	0	0	0		0	0	0%		
TOTAL REC'V'D	47	0	7	0	0	0	54	108			

Summary for All Defensive Exercises

SENDER / RECEIVER	Co Cmmdr	Co XO	A Plt Ldr	B Plt Ldr	C Plt Ldr	Co 1Sgt	TOTAL SENT	TOTAL S & R	% TOTAL	% Rec'd	% Sent
Co Cmdr		0	18	0	0	0	18	343	98%	95%	5%
Co XO	0		0	0	0	0	0	0	0%		
A Plt Ldr	153	0				0	153	171	49%	11%	89%
B Plt Ldr	94	0				4	98	98	28%	0%	100%
C Plt Ldr	78	0				3	81	81	23%	0%	100%
Co 1Sgt	0	0	0	0	0		0	7	2%	100%	0%
TOTAL REC'V'D	325	0	18	0	0	7	350	700	2		

SUMMARIES FOR OFFENSIVE EXERCISES

Summary for Exercise CV_0406_A_O_10

RECEIVER / SENDER	Co Cmmdr	Co XO	A Plt Ldr	B Plt Ldr	C Plt Ldr	Co 1Sgt	TOTAL SENT	TOTAL S & R	% TOTAL	% Rec'd	% Sent
Co Cmdr		0	2	0	0	0	2	47	98%	96%	4%
Co XO			0	0	0	0	0	0	0%		
A Plt Ldr	19					0	19	22	46%	0%	86%
B Plt Ldr	15					0	15	15	31%	20%	100%
C Plt Ldr	11					0	11	11	23%	0%	100%
Co 1Sgt	0	0	1	0	0		1	1	2%	0%	100%
TOTAL REC'V'D	45	0	3	0	0	0	48				

Summary for Exercise CV_0419_A_O_12

RECEIVER / SENDER	Co Cmmdr	Co XO	A Plt Ldr	B Plt Ldr	C Plt Ldr	Co 1Sgt	TOTAL SENT	TOTAL S & R	% TOTAL	% Rec'd	% Sent
Co Cmdr		0	2	0	0	0	2	96	95%	98%	2%
Co XO	0	0	0	0	0	0	0	0	0%		
A Plt Ldr	49					2	51	53	52%	4%	96%
B Plt Ldr	15					1	16	16	16%	0%	100%
C Plt Ldr	30					2	32	32	32%	0%	100%
Co 1Sgt	0	0	0	0	0		0	5	5%	100%	0%
TOTAL REC'V'D	94	0	2	0	0	5	101				

Summary for Exercise CV_0426_A_O_13

RECEIVER / SENDER	Co Cmmdr	Co XO	A Plt Ldr	B Plt Ldr	C Plt Ldr	Co 1Sgt	TOTAL SENT	TOTAL S & R	% TOTAL	% Rec'd	% Sent
Co Cmdr		0	3	0	0	0	3	53	100%	94%	6%
Co XO	0		0	0	0	0	0	0	0%		
A Plt Ldr	30	0				0	30	33	62%	9%	91%
B Plt Ldr	14	0				0	14	14	26%	0%	100%
C Plt Ldr	6	0				0	6	6	11%	0%	100%
Co 1Sgt	0	0	0	0	0		0	0	0%		
TOTAL REC'V'D	50	0	3	0	0	0	53				

Summary for Exercise CV_0503_A_O_14

SENDER / RECEIVER	Co Cmmdr	Co XO	A Plt Ldr	B Plt Ldr	C Plt Ldr	Co 1Sgt	TOTAL SENT	TOTAL S & R	% TOTAL	% Rec'd	% Sent
Co Cmdr		0	2	0	0	0	2	108	98%	98%	2%
Co XO	0		0	0	0	0	0	0	0%		
A Plt Ldr	49	0				1	50	52	47%	4%	96%
B Plt Ldr	30	0				0	30	30	27%	0%	100%
C Plt Ldr	27	0				1	28	28	25%	0%	100%
Co 1Sgt	0	0	0	0	0		0	2	2%	100%	0%
TOTAL REC'V'D	106	0	2	0	0	2	110				

Summary for Exercise CV_0511_A_O_15

SENDER / RECEIVER	Co Cmmdr	Co XO	A Plt Ldr	B Plt Ldr	C Plt Ldr	Co 1Sgt	TOTAL SENT	TOTAL S & R	% TOTAL	% Rec'd	% Sent
Co Cmdr		0	2	0	0	0	2	61	100%	97%	3%
Co XO	0		0	0	0	0	0	0	0%		
A Plt Ldr	38	0				0	38	40	66%	5%	95%
B Plt Ldr	17	0				0	17	17	28%	0%	100%
C Plt Ldr	4	0				0	4	4	7%	0%	100%
Co 1Sgt	0	0	0	0	0		0	0	0%		
TOTAL REC'V'D	59	0	2	0	0	0	61				

Summary for All Offensive Exercises

SENDER / RECEIVER	Co Cmmdr	Co XO	A Plt Ldr	B Plt Ldr	C Plt Ldr	Co 1Sgt	TOTAL SENT	TOTAL S & R	% TOTAL	% Rec'd	% Sent
Co Cmdr		0	11	0	0	0	11	365	98%	97%	3%
Co XO	0		0	0	0	0	0	0	0%		
A Platoon	185	0				3	188	200	54%	6%	94%
B Platoon	91	0				1	92	92	25%	0%	100%
C Platoon	78	0				3	81	81	22%	0%	100%
Co 1Sgt	0	0	1	0	0		1	8	2%	88%	13%
TOTAL REC'V'D	354	0	12	0	0	7	373				